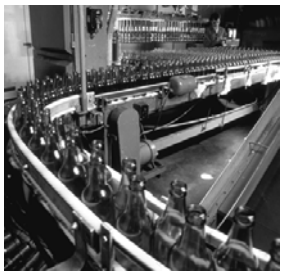
LISTEN.
THINK.
SOLVE.SM

PowerFlex® Digital DC Drive



USER MANUAL

Firmware Version 1.006

ALLEN-BRADLEY • ROCKWELL SOFTWARE

Rockwell Automation

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. *Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls* (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at **http://www.rockwellautomation.com/literature**) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation, Inc. is prohibited.

Throughout this manual, when necessary we use notes to make you aware of safety considerations.

WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

Important: Identifies information that is critical for successful application and understanding of the product.

ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequences.

Shock Hazard labels may be located on or inside the equipment (e.g., drive or motor) to alert people that dangerous voltage may be present.

Burn Hazard labels may be located on or inside the equipment (e.g., drive or motor) to alert people that surfaces may be at dangerous temperatures.

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Klixon® is a registered trademark of Sensata Technologies, Inc.

The information below summarizes the changes to the PowerFlex Digital DC Drive User Manual, publication 20-UM001… since the last release.

Manual Updates

Change	Page(s)
Removed erroneous derating information.	1-1, A-1
Updated AC Input Voltages tables.	1-12
Updated “AnalogCflct” Alarm description to include parameters 1323-1327 [DPI Px Select].	4-7
Updated Agency Certification Information.	A-1
Added notation regarding required installation in a Pollution Degree 2 environment.	A-1
Updated the Maximum Short Circuit Ratings data.	A-2
Added footnote regarding coil voltage to DC Loop Contactor table information.	A-18
Updated block diagrams to correct parameter numbers and names.	D-2

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Overview

The purpose of this manual is to provide you with the basic information needed to install, start-up and troubleshoot the PowerFlex DC drive.

For information on . . .	See page . . .
Who Should Use this Manual?	Preface-1
What is in this Manual?	Preface-1
Drive Storage Conditions	Preface-1
Drive Nameplate Data	Preface-2
Reference Materials	Preface-2
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Who Should Use this Manual?

This manual is intended for qualified personnel. You must be able to program and operate DC drives. In addition, you must have an understanding of the parameter settings and functions detailed in this manual.

What is in this Manual?

The PowerFlex DC User Manual is designed to provide installation, basic start-up information, and drive parameter definitions. For detailed drive information, please refer to “Reference Materials” on page Preface-2 for a list of additional publications.

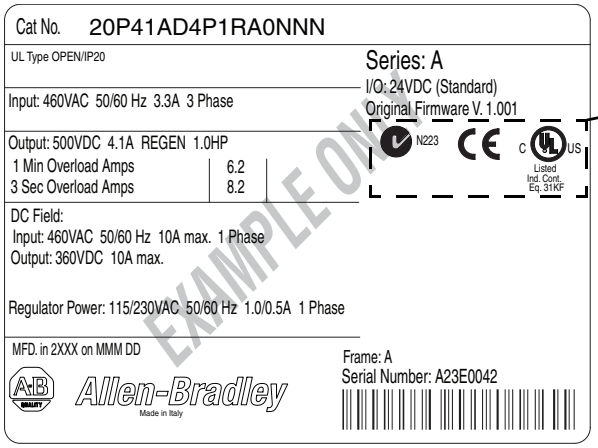
Drive Storage Conditions

If it is necessary to store the drive for any length of time before installation, follow these storage guidelines in order to ensure satisfactory operation at start up and to maintain warranty coverage:

- After receipt and inspection, repack the drive in its original shipping container and store in a clean, dry place.
- Place where the ambient temperatures do not exceed -25° C (-13° F) or +55° C (131° F)
- Place where the relative air humidity range does not exceed 5% - 95%.
- At an altitude of less than 3,000 meters (10,000 ft.) above sea level.

Drive Nameplate Data

The PowerFlex DC drive contains a data nameplate located on the side of each drive that identifies the specific model number design, applicable AC input power and DC output power data. All communication with Rockwell Automation personnel concerning this product should include this information.


Cat No. 20P41AD4P1RA0NNN
UL Type OPEN/IP20
Series: A
I/O: 24VDC (Standard)
Original Firmware V. 1.001
Input: 460VAC 50/60 Hz 3.3A 3 Phase
Output: 500VDC 4.1A REGEN 1.0HP
1 Min Overload Amps 6.2
3 Sec Overload Amps 8.2
DC Field:
Input: 460VAC 50/60 Hz 10A max. 1 Phase
Output: 360VDC 10A max.
Regulator Power: 115/230VAC 50/60 Hz 1.0/0.5A 1 Phase
MFD. in 2XXX on MMM DD
Frame: A
Serial Number: A23E0042
Allen-Bradley
Made in Italy
EXAMPLE ONLY

Note: Certification Marks Location.

Refer to the data nameplate label on your drive for actual agency certifications.

Drive Frame Sizes

Similar PowerFlex DC drive sizes are grouped into frame sizes to simplify spare parts ordering, dimensioning, etc. Refer to the Catalog Number Explanation on page Preface-4 for a list of drive catalog numbers and their respective frame sizes.

Reference Materials

The following manuals are recommended for general drive information:

Title	Publication	Available Online at . . .
Preventive Maintenance of Industrial Control and Drive System Equipment	DRIVES-TD001...	**www.rockwellautomation.com/literature**
Safety Guidelines for the Application, Installation and Maintenance of Solid State Control	SGI-1.1	
A Global Reference Guide for Reading Schematic Diagrams	100-2.10	
Guarding Against Electrostatic Damage	8000-4.5.2	

For Allen-Bradley Drives Technical Support:

Title	Online at . . .
Allen-Bradley Drives Technical Support	**www.ab.com/support/abdrives**

Manual Conventions

- To help differentiate parameter names and LCD display text from other text, the following conventions will be used:
  - Parameter Names will appear in [brackets]. For example: [Armature Voltage].
  - Display Text will appear in “quotes.” For example: “Enabled.”
- The following words are used throughout the manual to describe an action:

Word	Meaning
Can	Possible, able to do something
Cannot	Not possible, not able to do something
May	Permitted, allowed
Must	Unavoidable, you must do this
Shall	Required and necessary
Should	Recommended
Should Not	Not recommended

General Precautions

ATTENTION: This drive contains ESD (Electrostatic Discharge) sensitive parts and assemblies. Static control precautions are required when installing, testing, servicing or repairing this assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with static control procedures, reference A-B publication 8000-4.5.2, “Guarding Against Electrostatic Damage” or any other applicable ESD protection handbook.

ATTENTION: An incorrectly applied or installed drive can result in component damage or a reduction in product life. Wiring or application errors, such as, undersizing the motor, incorrect or inadequate AC supply, or excessive surrounding air temperatures may result in malfunction of the system.

ATTENTION: Only qualified personnel familiar with DC drives and associated machinery should plan or implement the installation, start-up and subsequent maintenance of the system. Failure to comply may result in personal injury and/or equipment damage.

ATTENTION: An incorrectly applied or installed bypass system can result in component damage or reduction in product life. The most common causes are:

- Wiring AC line to drive output or control terminals.
- Improper bypass or output circuits not approved by Allen-Bradley.
- Output circuits which do not connect directly to the motor.

Contact Allen-Bradley for assistance with application or wiring.

Catalog Number Explanation

Position

1-3	4	5	6	7	8-10	11	12	13	14	15	16
20P	4	1	A	D	4P1	R	N	0	N	N	N
a	b	c	d	e	f	g	h	i	j	k	l

a

Drive	
Code	Type
20P	PowerFlex DC

b

Motor Operation	
Code	Type
2	Two Quadrant Operation
4	Four Quadrant Operation

c

Input Type	
Code	Type
1	6 Pulse
2	12 Pulse

d

Enclosure		
Code	Enclosure Rating	Conform. Coat
A	IP20, NEMA/UL Type Open	No
B	IP43, NEMA/UL Type 1 - Filter	No
G	IP54, NEMA/UL Type 12	No
H	IP54, NEMA/UL Type 12 - Fan/Filter	No
N	IP00, NEMA/UL Type Open	No

e

Input Voltage	
Code	Voltage
B	230V ac
C	400V ac
D	460V ac
E	600V ac
F	690V ac

f1

230V, 60 Hz Input				
Code	Hp	Armature Amps	Frame	Field Amps
7P0	1.5	7	A	10
9P0	2	9	A	10
012	3	12	A	10
020	5	20	A	10
029	7.5	29	A	10
038	10	38	A	10
055	15	55	A	10
073	20	73	A	14
093	25	93	A	14
110	30	110	A	14
146	40	146	B	20
180	50	180	B	20
218	60	218	B	20
265	75	265	B	20
360	100	360	B	20
434	125	434	B	20
521	150	521	C	20

f2

460V, 60 Hz Input				
Code	Hp	Armature Amps	Frame	Field Amps
4P1	2	4.1	A	10
6P0	3	6	A	10
010	5	10	A	10
014	7.5	14	A	10
019	10	19	A	10
027	15	27	A	10
035	20	35	A	10
045	25	45	A	10
052	30	52	A	10
073	40	73	A	14
086	50	86	A	14
100	60	100	A	14
129	75	129	A	14
167	100	167	B	20
207	125	207	B	20
250	150	250	B	20
330	200	330	B	20
412	250	412	B	20
495	300	495	C	20
667	400	667	C	20

g

Field Supply	
Code	Type
A	Three-Phase Regulated
F	Fixed Field w/Economy
R	Single-Phase Regulated

h

Packaging/Documentation		
Code	Shipping Carton	User Manual
0	No	No
A	Yes	Yes
N	Yes	No
Q	No	Yes

i

HIM	
Code	Operator Interface
0	Blank Cover ∗

∗ Standard - for additional selections, refer to the PowerFlex Digital DC Drive Technical Data, publication 20P-TD001...

j

I/O Options	
Code	Control
A	I/O Expansion Card (4 Additional 24V dc Digital Inputs & Outputs, 2 Analog Outputs)
B	115V ac Conversion Card (8 Digital Inputs & Outputs)
C	I/O Expansion Card + 115V ac Conversion
N	None (8 - 24V dc Digital Inputs & Outputs, 3 Analog Outputs and 2 Analog Inputs are Standard)

k

Communication Options	
Code	Description
N	None ∗

∗ Standard - for additional selections, refer to the PowerFlex Digital DC Drive Technical Data, publication 20P-TD001...

l

Cabinet Options	
Code	Type
N	None

Installation and Wiring

This chapter provides information on mounting and wiring the PowerFlex DC drive.

For information on . .	See page
Mounting Considerations	1-1
Mounting Dimensions and Weights	1-2
Lifting PowerFlex DC Drives	1-5
Removing the Drive Covers	1-7
Line Reactors / Filters	1-9
Using Contactors	1-10

For information on. .	See page
Control Power Protection	1-10
General Grounding Requirements	1-11
Power Circuit Protection	1-12
Power Wiring	1-12
I/O Wiring	1-27

Table 0.A

Most start-up difficulties are the result of incorrect wiring. Every precaution must be taken to assure that the wiring is done as instructed. All items must be read and understood before the actual installation begins.

Important: The PowerFlex DC drive is not designed for use with multiple motor applications.

ATTENTION: The following information is merely a guide for proper installation. Rockwell Automation cannot assume responsibility for the compliance or the noncompliance to any code, national, local or otherwise for the proper installation of this drive or associated equipment. A hazard of personal injury and/or equipment damage exists if codes are ignored during installation.

Mounting Considerations

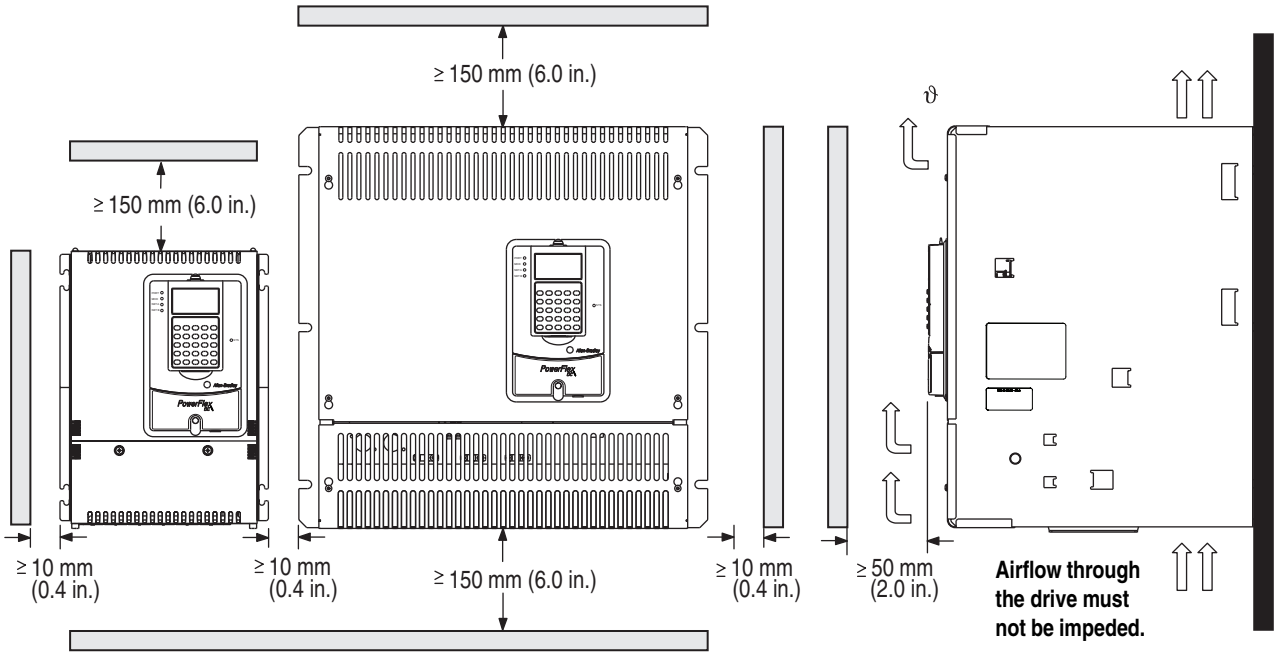
Operating Conditions and Temperatures

PowerFlex DC drives are designed to operate at 0° to 50° C surrounding air temperature without derating. The drive must be mounted in a clean, dry location. Contaminants such as oils, corrosive vapors and abrasive debris must be kept out of the enclosure. NEMA/UL Type Open, IP20 enclosures are intended for indoor use primarily to provide a degree of protection against contact with enclosed equipment. These enclosures offer no protection against airborne contaminants.

Minimum Mounting Clearances

Minimum clearance requirements (indicated in Figure 1.1) are intended to be from drive to drive. Other objects can occupy this space; however, reduced airflow may cause protection circuits to fault the drive. The drive must be mounted in a vertical orientation as shown below and must not be mounted at an angle greater than 30° from vertical. In addition, inlet air temperature must not exceed the product specification.

Figure 1.1 Drive Enclosure Minimum Mounting Clearances



Mounting Dimensions and Weights

The PowerFlex DC drive is available in a NEMA/UL Type Open, IP20 enclosure. Following all mounting instructions in order to ensure proper operation.

ATTENTION: Remove all loose packing materials, including the container(s) of desiccants (if any), from the drive enclosure before mounting and energizing the drive.

Figure 1.2 Frame A Approximate Dimensions

A	B	C	A1	B1
mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)
267 (10.5)	359 (14.0)	287 (11.3)	250 (9.8)	275 (10.8)

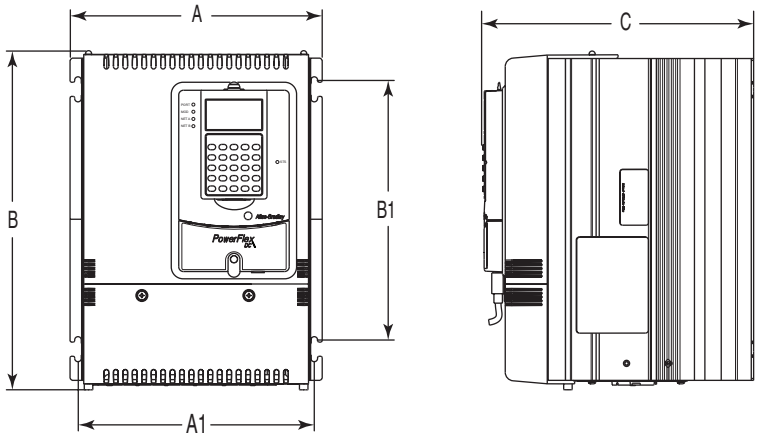


Table 1.A Frame A Weights

		Weight	
Drive Current Rating Code		**Drive**	**Drive & Packaging**
230V	**460V**	**kg (lbs.)**	**kg (lbs.)**
7P0	4P1	8.4 (19.5)	10.5 (23.1)
9P0	6P0		
012	010		
020	014		
–	019		
029	027		
038	035	8.8 (19.4)	11 (24.3)
055	045		
–	052		
073	073	10.8 (23.8)	13 (28.7)
093	086		
110	100		
–	129		

Figure 1.3 Frame B Approximate Dimensions

A	A1	A2	B	B1	C
mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)
311 (12.2)	275 (10.8)	16.5 (0.65)	388 (15.3)	375 (14.8)	350 (13.8)

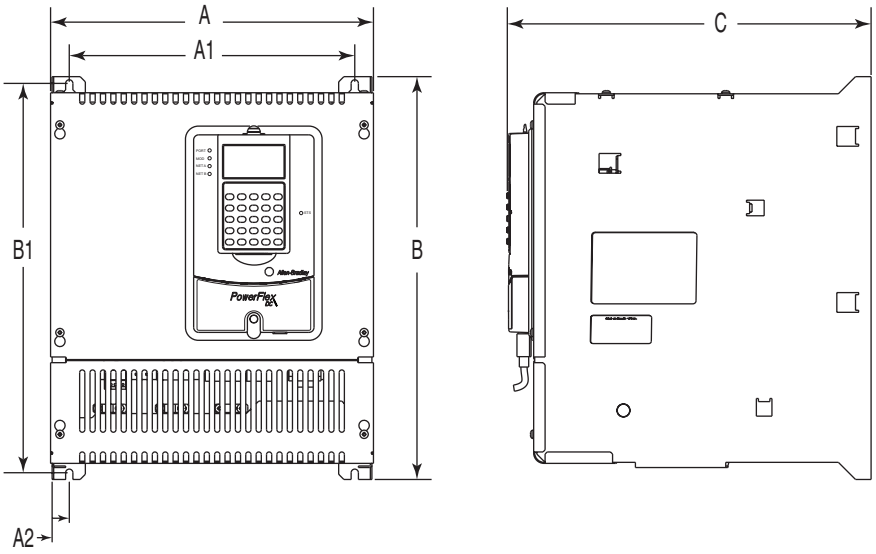


Table 1.B Frame B Weights

Drive w/ND Rating Code		Weight	
		Drive	Drive & Packaging
230V	**460V**	**kg (lbs.)**	**kg (lbs.)**
146	167	25.5 (56.2)	27.5 (60.6)
180	207		
218	–		
265	250	29.5 (65.0)	31.5 (69.4)
360	330	32 (70.5)	34 (75)
434	412		

Figure 1.4 Frame C Approximate Dimensions

A	A1	B	B1	B2	B3	B4	C
mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)
521 (20.5)	499 (19.7)	511 (20.1)	400 (15.7)	200 (7.9)	55 (2.2)	56 (2.2)	416 (16.4)

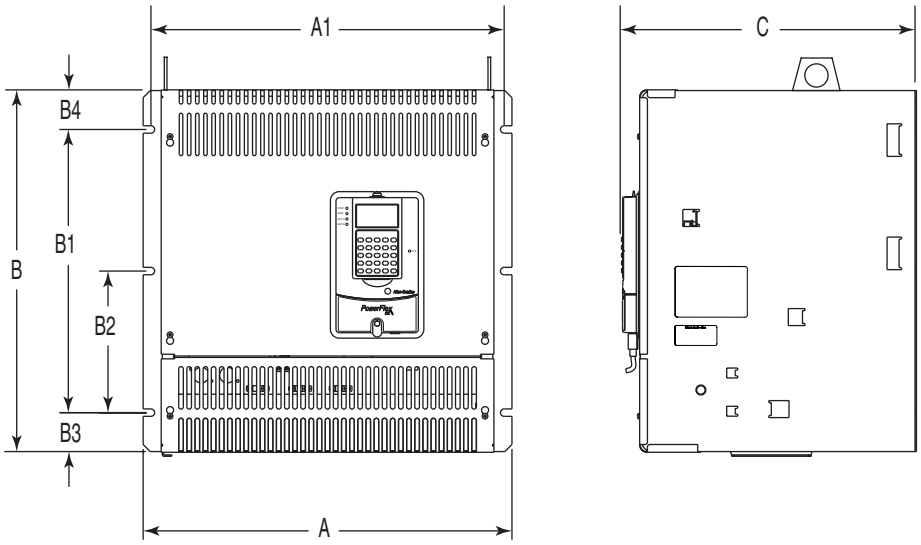


Table 1.C Frame C Weights

		Weight - Regenerative Drives		Weight - Non-regenerative Drives	
Drive w/ND Rating Code		Drive	Drive & Packaging	Drive	Drive & Packaging
230V	460V	kg (lbs.)	kg (lbs.)	kg (lbs.)	kg (lbs.)
–	495	61 (134.5)	74 (163.1)	57 (125.7)	70 (154.3)
521	667	65 (143.3)	81 (178.6)	62 (136.7)	75 (165.3)

Lifting PowerFlex DC Drives

The dimensions and weights specified above must be taken into consideration when mounting the device. Use the proper equipment to safely lift and hold the weight of the drive while mounting.

ATTENTION: To guard against possible personal injury or equipment damage . . .

- Inspect all lifting hardware for proper attachment before lifting the drive.
- Do Not allow any part of the drive or lifting mechanism to make contact with electrically charged conductors or components.
- Do Not subject the drive to high rates of acceleration or deceleration while transporting to the mounting location or when lifting.
- Do Not allow personnel or their limbs directly underneath the drive when it is being lifted and mounted.

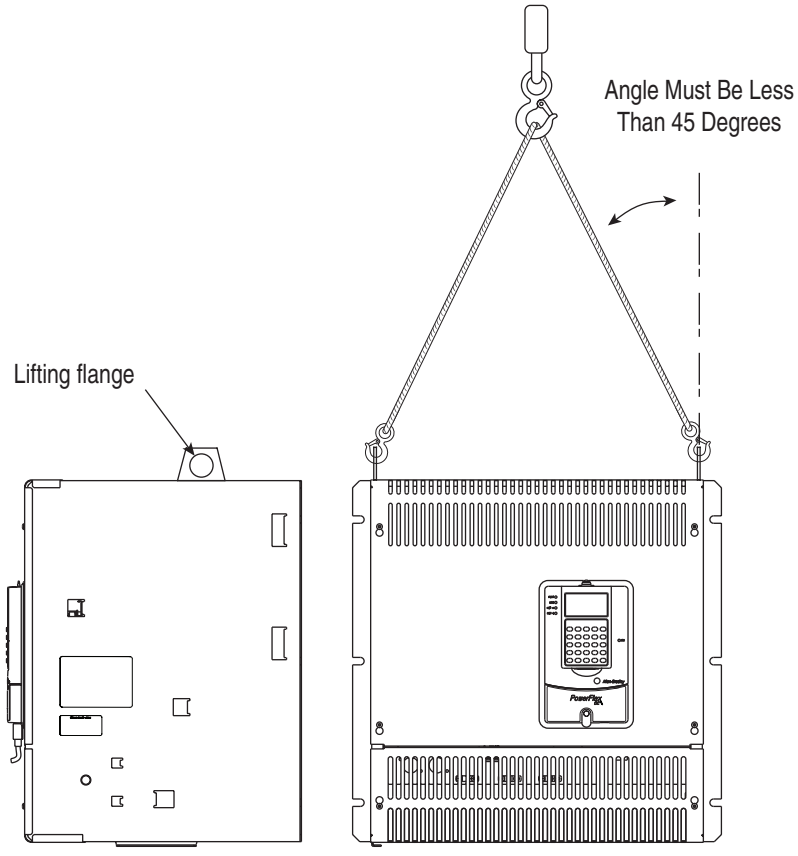
Mounting Frame C Drives

All lifting equipment and lifting components (hooks, bolts, lifts, slings, chains, etc.) must have a minimum lifting capacity of 453.6 kg (1,000 lb.).

Important: Verify that all mounting screws are properly tightened before and after drive operation.

1. Verify the hole pattern on the panel to which the drive will be mounted. Refer to Figure 1.4 on page 1-5.
2. Insert, but do not tighten, one bolt in one of the top holes in the panel. The bolt must be fully threaded into the panel before hanging the drive.
3. Insert the properly sized and rated lifting hooks into the holes on the lifting flanges at the top of the drive. To limit the pull in forces on the drive, the lifting devices connected to the hooks must be long enough to make the angle between the chain or cable and a vertical line extending up from the flange center less than 45 degrees as illustrated below.

Figure 1.5 Lifting Angle



4. Lift the drive into place on to the bolt installed in the panel.
5. Install the remaining five bolts into the panel. Tighten all bolts to a torque of 22.6 N-m (200 lb.-in.).

Removing the Drive Covers

The lower protective cover must be removed in order to access the drive's power and I/O terminals. The upper cover only needs to be removed to install an optional communication adapter and service the drive. (Refer to Installing a Communication Adapter on page E-1 for information.)

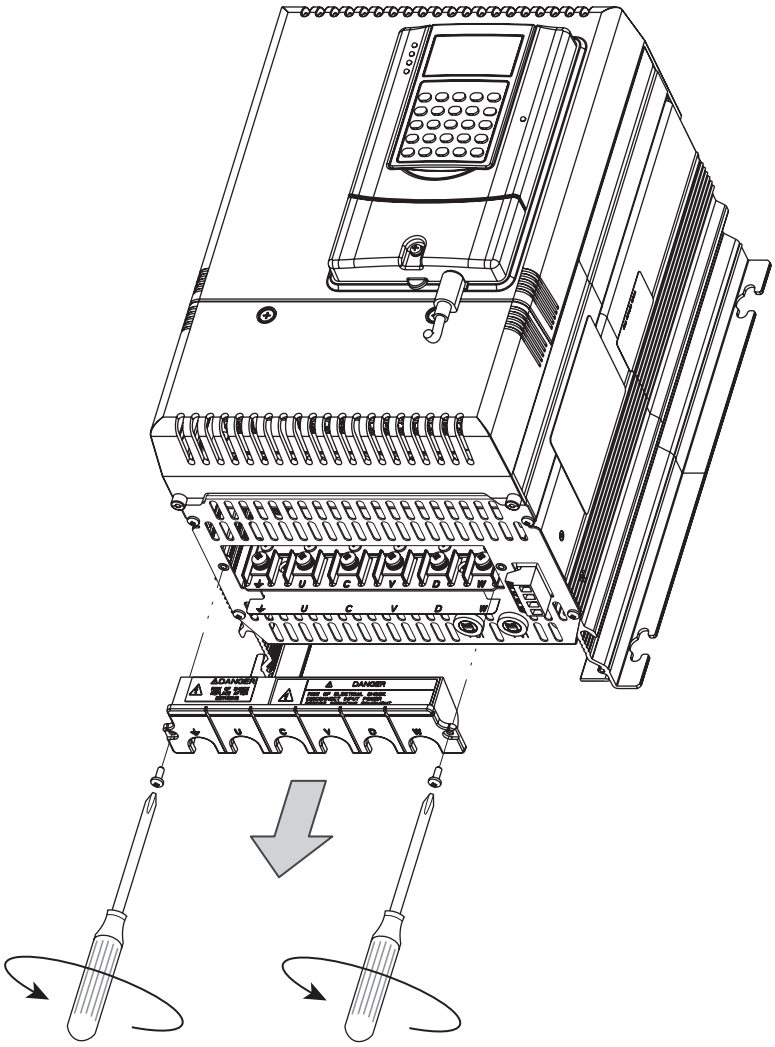
Frame A Drives

You must remove both the lower protective cover and the power terminal cover on frame A drives to access the power terminals.

Remove the Power Terminal Cover

Remove the two screws as shown below and slide the cover down and off the chassis.

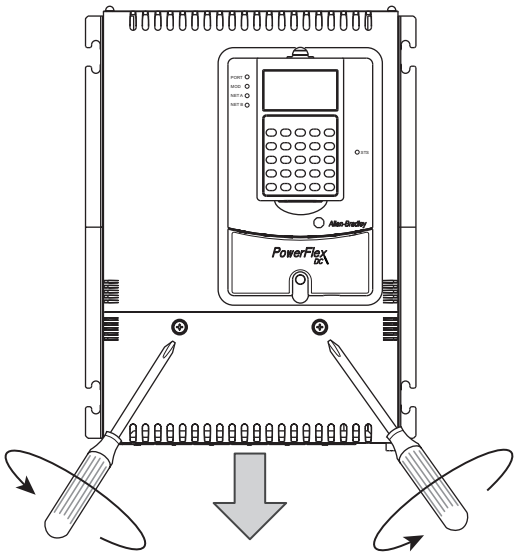
Figure 1.6 Frame A Power Terminal Cover Removal



Remove the Lower Protective Cover

Remove the two screws as shown below and, while gently lifting along the top edge, slide the cover down and off the chassis.

Figure 1.7 Frame A Lower Cover Removal

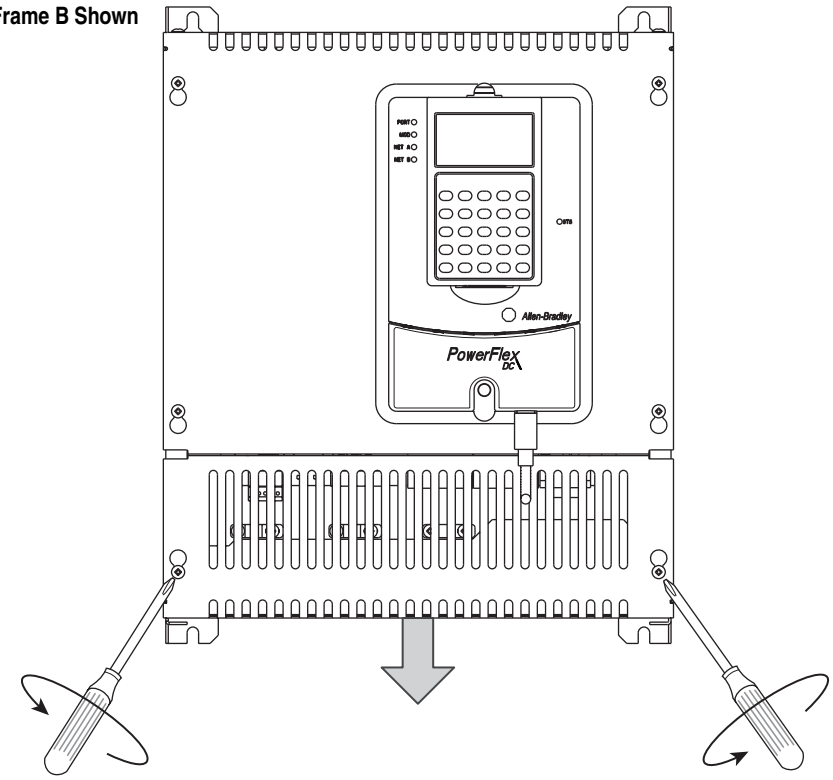


Frame B and C Drives

Loosen, but do not remove, the two screws that secure the bottom cover. Then, slide the cover down until the screw heads line up with the key holes and lift the cover off the chassis.

Figure 1.8 Frame B & C Drive Cover Removal

Frame B Shown



Line Reactors / Filters

When connecting the drive directly to the main distribution system an AC line reactor must be used to guard against system disturbance. The type of line reactor used depends upon the following:

- the current absorbed by the AC input
- the AC input voltage
- the relative short circuit voltage
- the AC input frequency

Refer to AC Input Line Reactors and AC Input Contactors on page A-16 for a list of recommended AC line reactors.

Using Contactors

When using an AC input contactor, the IEC AC1 rating of the contactor must be equal to the rated thermal (RMS) current value at the mains input of the drive.

The type of contactor used (AC input or DC output contactor, with or without a dynamic brake) is configured as follows:

- When only a contactor is used:
  - Set parameter 1391 [ContactorControl] to “Contactor” (default value)
  - Set one relay output and one digital input to “Contactor” (default value for parameters 1392 [Relay Out 1 Sel] and 140 [Digital In8 Sel])
- When an AC or DC contactor and dynamic brake contactor are used:
  - Set parameter 1391 [ContactorControl] to “Contactor+DB”
  - Set one relay output (parameter 1392 [Relay Out 1 Sel] or parameter 629 [Relay Out 2 Sel]) to “Contactor” and the other relay output to “ContactorDB”
  - Set one digital input to “Contactor” (default value for parameter 140 [Digital In8 Sel])
- When a contactor is NOT used:
  - Set parameter 1391 [ContactorControl] to “None”
  - Do NOT set either relay output to “Contactor” or “ContactorDB”
  - Do NOT set any digital input to “Contactor”

Because any relay output can be configured as a contactor or dynamic brake control and any digital input as contactor status, care must be taken to correctly wire the terminal blocks to match the parameter selections. Refer to Relay Outputs on page 1-21 and I/O Signal and Control Wiring on page 1-31 for wiring information.

AC Input Contactors

Refer to AC Input Line Reactors and AC Input Contactors on page A-16 for a list of recommended AC input contactors.

DC Output Contactors

A DC output contactor can be used to connect the output of the armature circuit to the DC motor. If a DC output contactor is used, an AC input contactor is not needed.

Refer to DC Output Contactors and Dynamic Brake Resistor Kits on page A-18 for a list of recommended DC output contactors.

Dynamic Brake Resistors

Refer to DC Output Contactors and Dynamic Brake Resistor Kits on page A-18 for a list of recommended dynamic brake resistor kits.

Control Power Protection

The 115V / 230V AC control circuit power input terminals U2 and V2 are required to be short circuit protected. This protection can be provided by using standard time delay fuses or a circuit breaker.

The time delay fuses or circuit breaker must be selected to survive the short circuit available current of the feeder source for this circuit and the inrush current of the drive's power supply.

The rating of the fuses or circuit breaker should be sized mainly to protect the wiring from the fuses/circuit breaker connections to terminals U2 and V2, and not nuisance trip or blow from the inrush current.

The table below lists the input current characteristics of the control power.

Table 1.D Control Power Protection

	Drive Current Rating Code[1]		Control Power Supply					
					Rated input current		Inrush input current	
Frame	230V	460V	Board ID	Power	115V	230V	115V	230V
A	7P0 through 110	4P1 through 129	SW1-31	60 W	1 A	0.5 A	20 A	10 A
B & C	146 through 521	167 through 667	SW2-32	110 W	1.2 A	0.7 A	15 A	7.5 A

(1) Refer to Catalog Number Explanation on page Preface-4, positions 8-10 for corresponding drive HP rating, armature amp rating and field amp rating.

Control power input should be supplied by a power source that is stabilized and buffered from the power system transients. The control power of many drives can be fed from a single source, as long as proper distribution protection is provided.

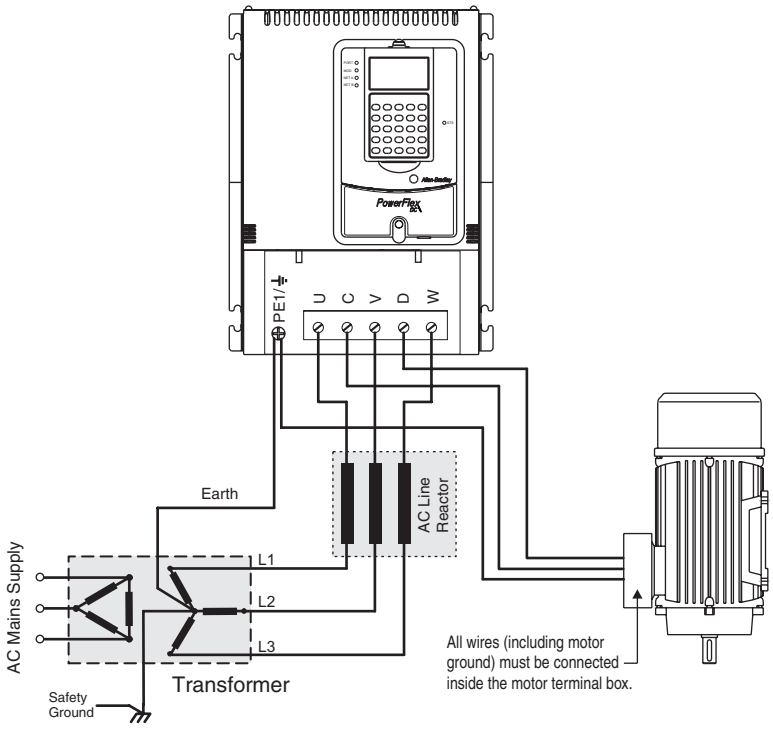
General Grounding Requirements

The drive Safety Ground - PE must be connected to system ground. Ground impedance must conform to the requirements of national and local industrial safety regulations and/or electrical codes. The integrity of all ground connections should be periodically checked.

For installations within a cabinet, a single safety ground point or ground bus bar connected directly to building steel should be used. All circuits including the AC input ground conductor should be grounded independently and directly to this point/bar.

ATTENTION: In order to comply with the essential requirements of the CE Low Voltage Directive 2006/95/EC, PowerFlex DC drives may not be powered from a corner-earthed (TN with one phase earthed) supply system. Although PowerFlex DC drives are compliant with the requirements of the CE Low Voltage Directive when powered from an IT or impedance-earthed supply system, power must be removed from the drive as soon as possible after an earth fault is detected in the power system to satisfy CE safety requirements related to the insulation system of the drive.

Figure 1.9 Typical Grounding



Safety Ground (PE)

This is the safety ground for the drive that is required by code. This point must be connected to adjacent building steel (girder, joist), a floor ground rod or bus bar (see above). Grounding points must comply with national and local industrial safety regulations and/or electrical codes.

Power Feeder

Each power feeder from the substation transformer to the drive must be provided with properly sized ground cables. The conduit or cable armor should be bonded to the substation ground at both ends. Each transformer enclosure and/or frame must be bonded to ground at a minimum of two locations.

Encoder Ground Connections

If used, must be routed in grounded steel conduit. The conduit must be grounded at both ends. Ground the cable shield at the motor end only.

Tachometer Ground Connections

If used, ground connections must be routed in grounded steel conduit. The conduit must be grounded at both ends. Ground the cable shield at the drive end only using the shield clamps on the grounded metal plate supporting the control board (refer to I/O Terminal Block Locations on page 1-32 for shield clamp location).

Power Circuit Protection

It is recommended that you install the PowerFlex DC drive with fast acting fuses to protect the armature converter on the AC input and DC output (for four quadrant drives only) sides. Internally mounted fuses for armature converter protection are provided with 230V, 521A and 460V, 495A and 667A frame C PowerFlex DC drives. Refer to Drive Power Circuit Protection on page A-7 for a list of replacement fuses and general fuse locations.

Power Wiring

AC Input Voltages

PowerFlex DC drives are rated for the following AC input voltages:

Armature Circuit	Field Circuit	Control Circuit
Terminals U, V, W	**Terminals U1, V1**	**Terminals U2, V2**
230V ±10 %, 3Ph 400V ±10 %, 3Ph 440V ±10 %, 3Ph 460V ±10 %, 3Ph 480V ±10 %, 3Ph @ 50/60 Hz ±5 %	230V ±10 %, 1Ph 400V ±10 %, 1Ph 460V ±10 %, 1Ph @ 50/60 Hz ±5 %	115V ±15 %, 1 Ph(1) or 230V ±15 %, 1Ph @ 50/60 Hz ±5 %

(1) For frame B and C drives only, a jumper must be placed between terminals SA-SB on the Switching Power Supply circuit board for the control circuits to work with 115V AC input. Refer to Figure 1.26 on page 1-25 for terminal block location on frame B drives and Figure 1.27 on page 1-26 for terminal block location on frame C drives.

DC Output Voltages

The output voltages below take into account an AC input undervoltage within the stated tolerance limits and a voltage drop of 4% due to an AC input line reactor. It is the same as the rated armature voltage suggested for the connected motor.

Armature Circuit

AC Input Voltage	DC Output Armature Voltage (Terminals C & D)	
(Terminals U, V, W)	Two Quadrant Drive	Four Quadrant Drive
230V ±10 %, 3Ph	260V	240V
400V ±10 %, 3Ph	470V	420V
440V ±10 %, 3Ph	530V	460V
460V ±10 %, 3Ph	560V	480V
480V ±10 %, 3Ph	580V	500V

Field Circuit

AC Input Voltage	DC Output Field Voltage[1] (Terminals C1 & D1)	
(Terminals U1 & V1)	Fixed Field	Adjustable Field
230V ±15 %, 1Ph	200V	200V
400V ±15 %, 1Ph	310V	310V
460V ±10%, 1Ph	360V	360V

(1) The max field voltage is equal to 0.85 x AC input line voltage

Typical Power Wiring Diagrams

The following diagram represents recommended power wiring configurations:

Figure 1.10 Power Wiring with AC Input Contactor

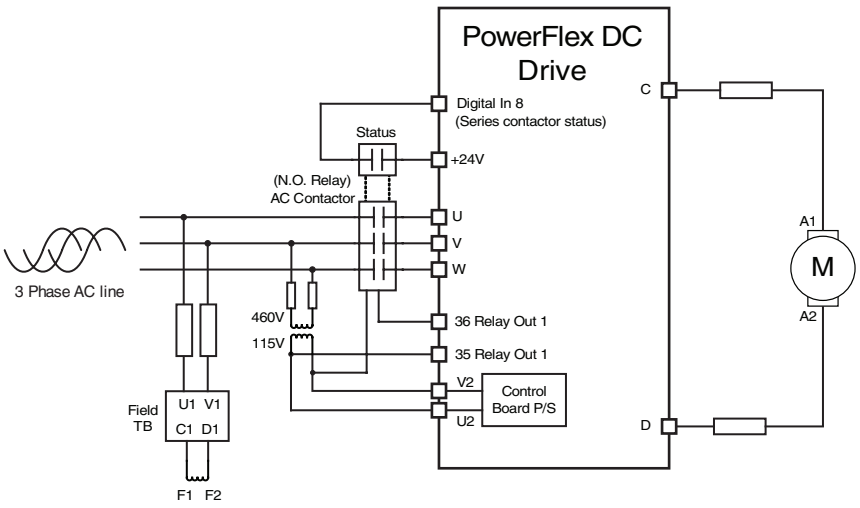


Figure 1.11 Power Wiring with AC Input Contactor and a Dynamic Brake

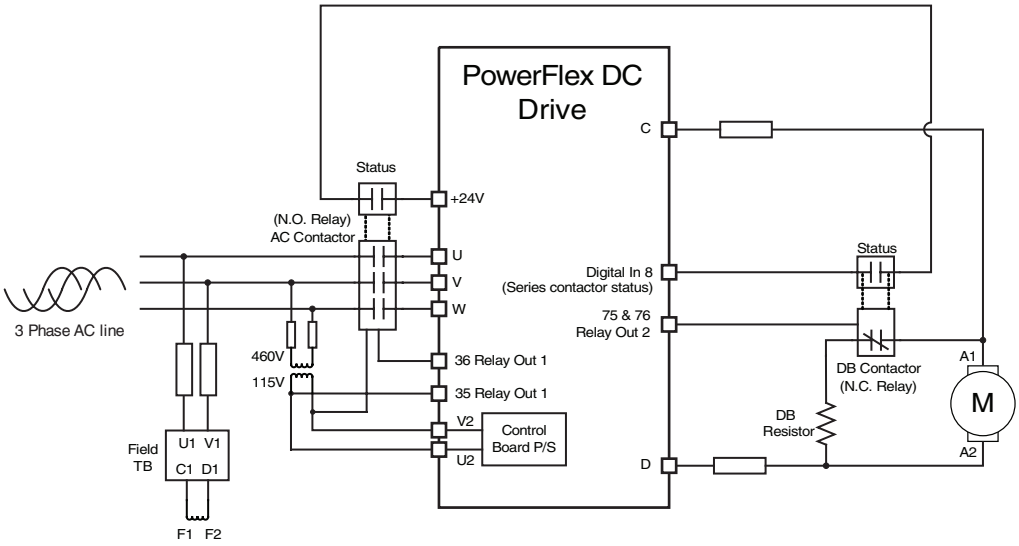


Figure 1.12 Power Wiring with DC Output Contactor

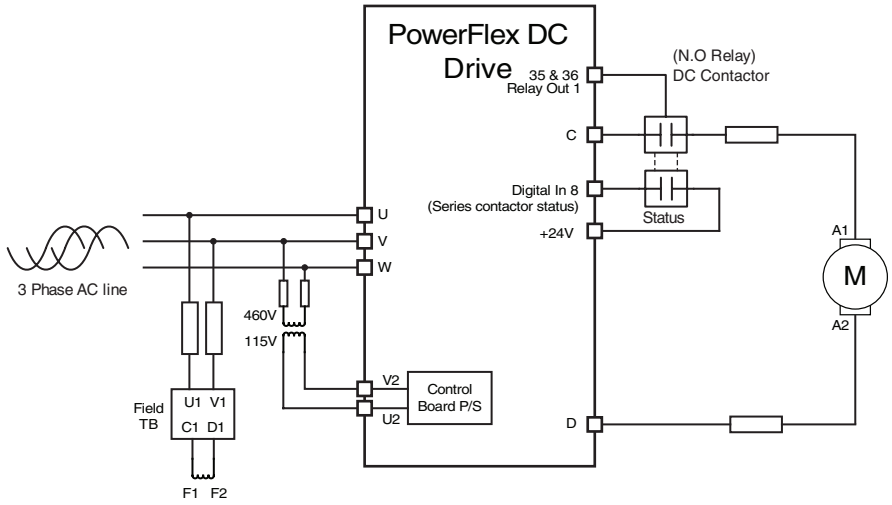


Figure 1.13 Power Wiring with DC Output Contactor and a Dynamic Brake

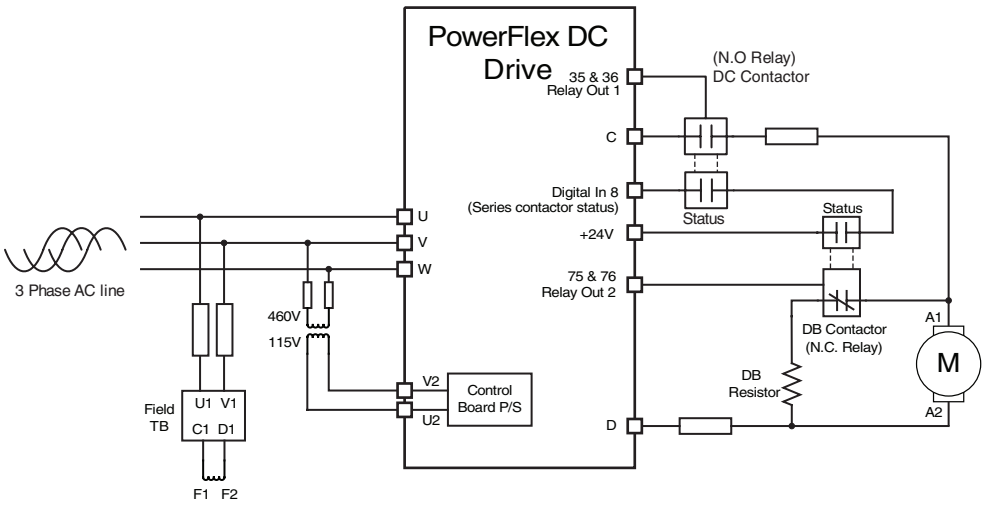


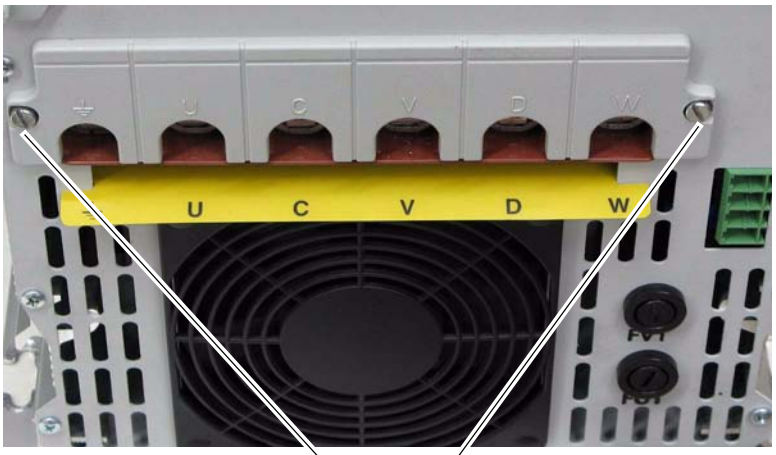
Table 1.E Power Terminal Designations

Terminals	Description	Refer to . . .
U, V, W	Three phase AC input to the armature converter	Armature Converter Connections on page 1-16
C, D	DC output to the motor armature	
U1, V1	Single phase AC input to the field circuit	Field Circuit Connections on page 1-19
C1, D1	DC output to the motor field	
U2, V2	Single phase AC power for the control circuits	Control Circuit Input Power on page 1-24
35, 36	Normally open contact. Configured with parameter 1392 [Relay Out 1 Sel] - set to 36 “Contactor” by default.	Relay Outputs on page 1-21
75, 76	Normally open contact. Configured with parameter 629 [Relay Out 2 Sel] - set to 5 “Ready” by default.	
78, 79	Motor thermistor connections (PTC)	Thermistors and Thermal Switches on page 1-21
U3, V3	Single phase AC power to the cooling fans (frame C drives only)	Frame C Heatsink Cooling Fans and Internal Fuse Signal Terminals on page 1-26
81, 82	Internal fuse signal (frame C drives only)	Frame C Heatsink Cooling Fans and Internal Fuse Signal Terminals on page 1-26

Armature Converter Connections

Figure 1.14 Frame A Armature Converter Terminal Block Location

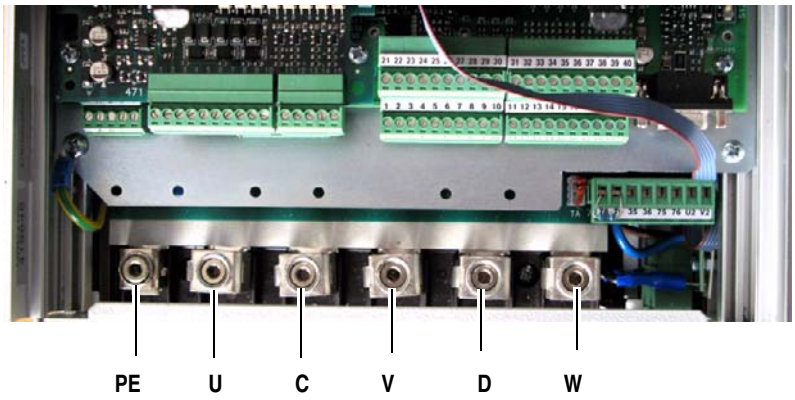
Bottom View



Loosen the two screws that secure the power terminal cover to the drive chassis and remove the terminal cover in order to connect the armature power wiring.

Front View

Note: Front view of drive shown with bottom protective and power terminal covers removed.



ATTENTION: Do not operate the drive with the power terminal cover removed. Operating the drive with the power terminal cover removed may result in a hazardous condition that could cause personal injury and/or equipment damage.

Figure 1.15 Frame B Armature Converter Terminal Block Location

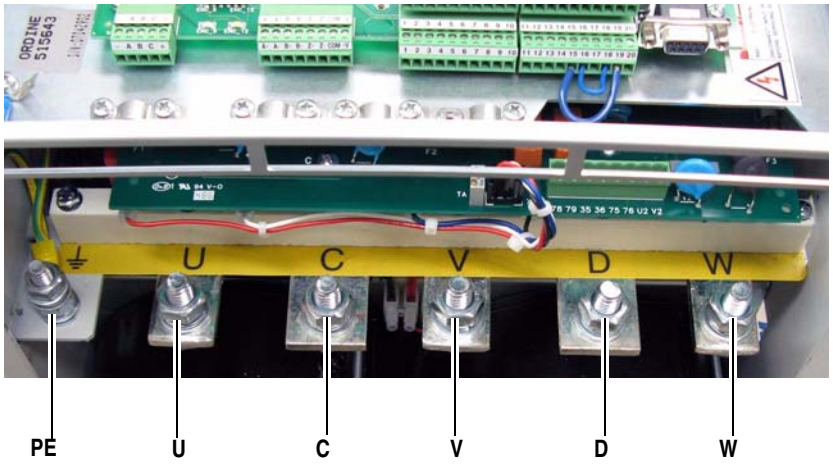
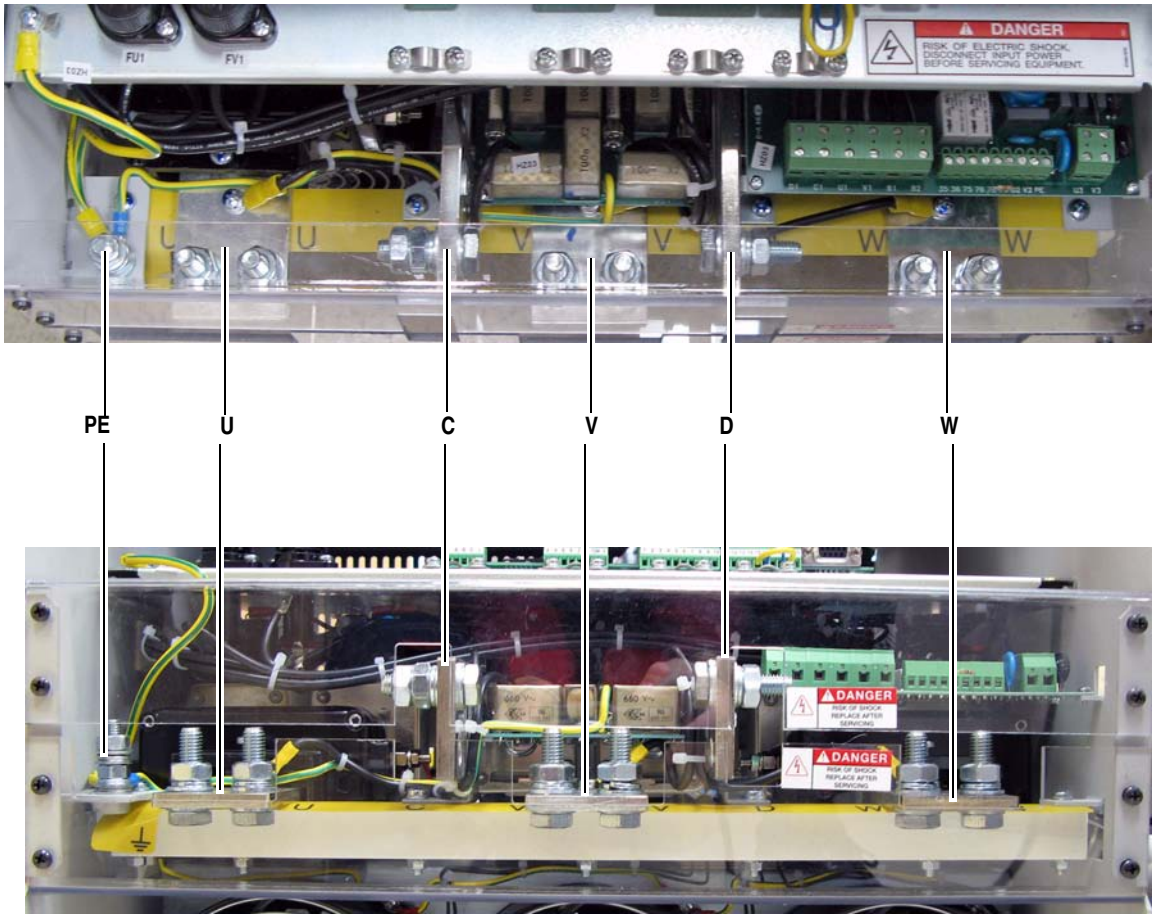


Figure 1.16 Frame C Armature Converter Terminal Block Location

Front View



Bottom View

Table 1.F Armature Terminal and Ground (PE) Wire Sizes

Frame	Drive Current Rating Code[1]		Terminals	Wire Size (AWG/kcmils)	Terminal Bolt Size (mm)	Tightening Torque (N-m / lbs.-in.)
	230V	460V				
A	7P0	4P1	U, V, W, C, D, PE	10	5	6 / 53
	9P0	6P0				
	012	010				
	020	014				
	–	019				
	029	027	U, V, W, C, D, PE	8	5	6 / 53
	038	035	U, V, W, C, D, PE	4	5	6 / 53
	055	045				
	–	052				
	073	073	U, V, W, C, D	1/0	Terminal Block	12 / 106
			PE	2		
	093	086	U, V, W, C, D	1/0	Terminal Block	12 / 106
			PE	2		
	110	–	U, V, W, C, D	1/0	Terminal Block	12 / 106
			PE	2		
	–	100	U, V, W	3/0	Terminal Block	12 / 106
			C, D	4/0 (kit required)		
			PE	2		
	–	129	U, V, W	3/0	Terminal Block	12 / 106
			C, D	4/0 (kit required)		
			PE	2		
B	146	167	U, V, W, C, D	2 x 2/0	10	50 / 442.5
			PE	2/0	8	25 / 221
	180	–	U, V, W, C, D	2 x 2/0	10	50 / 442.5
			PE	2/0	8	25 / 221
	218	207	U, V, W, C, D	2 x 4/0	10	50 / 442.5
			PE	2/0	8	25 / 221
	265	250	U, V, W	2 x 4/0	10	50 / 442.5
			C, D	2 x 300		
			PE	2/0	8	25 / 221
	–	330	U, V, W	2 x 300 (kit required)	10	50 / 442.5
			C, D	2 x 350 (kit required)		
			PE	2/0	8	25 / 221
	360	412	U, V, W	2 x 500 (kit required)	10	50 / 442.5
			C, D	2 x 600 (kit required)		
			PE	2/0	8	25 / 221
	434	–	U, V, W	2 x 500 (kit required)	10	50 / 442.5
			C, D	2 x 600 (kit required)		
			PE	2/0	8	25 / 221

Frame	Drive Current Rating Code[1]		Terminals	Wire Size (AWG/kcmils)	Terminal Bolt Size (mm)	Tightening Torque (N-m / lbs.-in.)
	230V	460V				
C	521	495	U, V, W	4 x 4/0	10	50 / 442.5
			C, D	4 x 250		
			PE	2/0	8	25 / 221
	–	667	U, V, W	4 x 300 (kit required)	10	50 / 442.5
			C, D	4 x 350 (kit required)		
			PE	2/0	8	25 / 221

(1) Refer to Catalog Number Explanation on page Preface-4, positions 8-10 for corresponding drive HP rating, armature amp rating and field amp rating.

Field Circuit Connections

Figure 1.17 Frame A Field Circuit Terminal Block Location

Bottom View

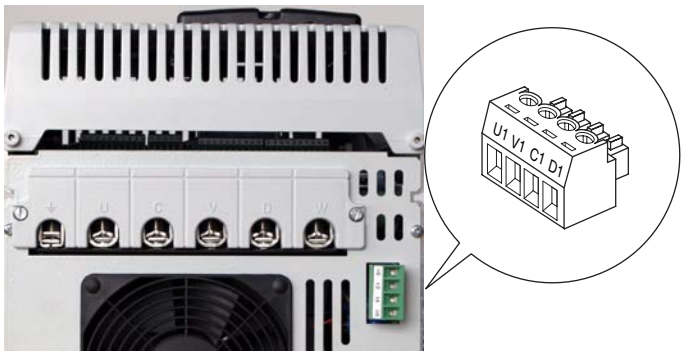


Figure 1.18 Frame B Field Circuit Terminal Block Location

Top of drive

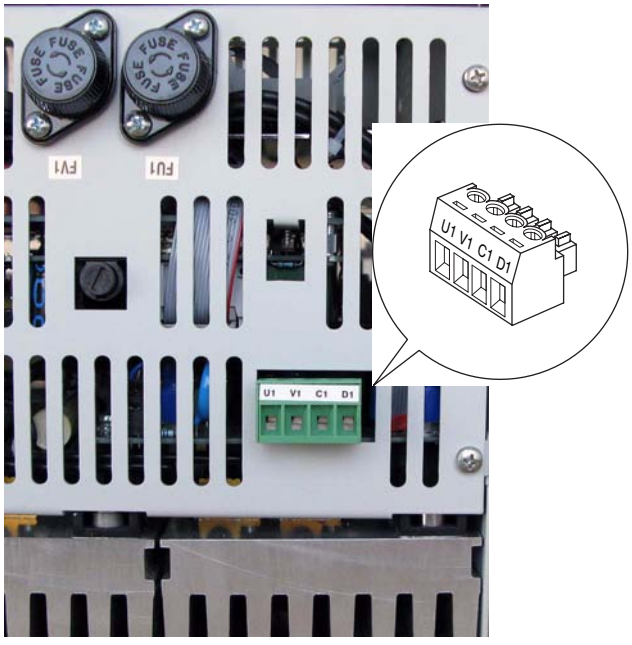


Figure 1.19 Frame C Field Circuit Terminal Block Location

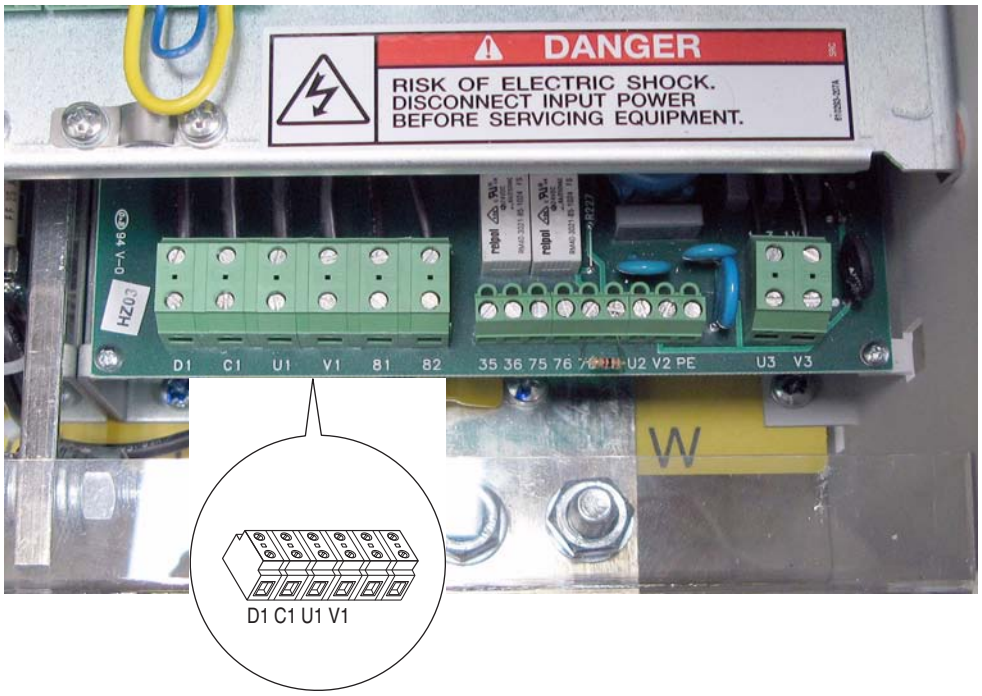


Table 1.G Field Circuit Wire Sizes

Frame	Drive Current Rating Code(1) 230V	460V	Terminals	Wire Size (AWG/kcmils)	Tightening Torque (N-m / lbs.-in.)
All	All	All	U1, V1, C1, D1	24 - 10	0.5 - 0.8 / 4.4 - 7.1

(1) Refer to Catalog Number Explanation on page Preface-4, positions 8-10 for corresponding drive HP rating, armature amp rating and field amp rating.

Field Current Resistors

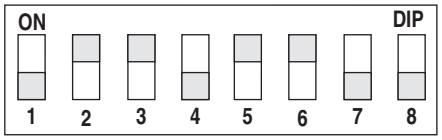
The drive's control circuit board is factory set to the minimum field current rating based on the drive size. The setting of DIP switch S14 must be changed to be ≥ the rated field current specified on the motor nameplate or possible motor damage may result. In addition, the value selected with switch S14 must be entered in parameter 374 [Drv Fld Brdg Cur] in the control software when the drive is commissioned (refer to Drive Start Up on page 2-1.)

ATTENTION: DIP switch S14 must be set to be ≥ the rated field current specified on the motor nameplate or possible motor damage may result.

Compare the field current value of the motor to the rated value of the internal field converter of the drive (see Table 1.H below) and set switch S14 to the closest value.

Note: The configuration of switch S14 is not required if the motor's field control is provided via an external source, however, in this case it is recommended that the switch settings be completed as described above.

Table 1.H DIP Switch S14 Field Current Configuration Settings



Note: Illustration is an example configuration only. DIP switch S14 must be set ≥ the rated field current specified on the motor nameplate or possible motor damage may result.

Switch ohms	148	330	182	36.4	845	1650			Equivalent Resistance
Field current scale	S14-1	S14-2	S14-3	S14-4	S14-5	S14-6	S14-7	S14-8	
1.0 A	OFF	OFF	OFF	OFF	OFF	ON	Not used		1650 ohm
2.0 A	OFF	OFF	OFF	OFF	ON	OFF			845 ohm
3.0 A	OFF	OFF	OFF	OFF	ON	ON			558.8 ohm
5.0 A	OFF	ON	OFF	OFF	OFF	OFF			330 ohm
10.0 A	ON	OFF	OFF	OFF	OFF	OFF			168 ohm
12.9 A	ON	OFF	OFF	OFF	ON	ON			129.2 ohm
17.2 A	OFF	ON	ON	OFF	ON	ON			97 ohm
20.0 A	ON	OFF	ON	OFF	OFF	ON			83 ohm
24.1 A	ON	ON	ON	OFF	OFF	OFF			69 ohm

Relay Outputs

Terminals 35 and 36 and 75 and 76 are N.O. relay outputs. The relay output between terminals 35 and 36 is configured with parameter 1392 [Relay Out 1 Sel]. The relay output between terminals 75 and 76 is configured with parameter 629 [Relay Out 2 Sel]. See Using Contactors on page 1-9 for more information.

Thermistors and Thermal Switches

To detect motor overheating and protect the motor from overloading, an external, user-supplied thermistor (PTC) or thermal switch must be connected to terminals 78 and 79. The drive's response to a motor over temperature fault is configured in parameter 365 [OverTemp Flt Cfg]. If a temperature sensor is not used, a 1k ohm resistor must be connected between terminals 78 and 79 (installed at the factory). Follow the appropriate instructions below when installing a thermal sensor.

Thermistors (PTC)

PTC thermistors fitted in the motor can be connected directly to the drive via terminals 78 and 79. In this case the 1k ohm resistor is not required between terminals 78 and 79.

Thermal Switches (Klixon®) in the Motor Windings

"Klixon" type temperature-dependent contacts can disconnect the drive from the motor via an external control or can be configured as an external fault using a digital input on drive. They can also be connected to terminals 78 and 79 in order to indicate a drive "Motor Over Temp" fault (F16), though this is not recommended due to the noise sensitivity of the current threshold circuitry. If a thermal switch is used a 1k ohm resistor must be placed in series between the switch and one of the terminals.

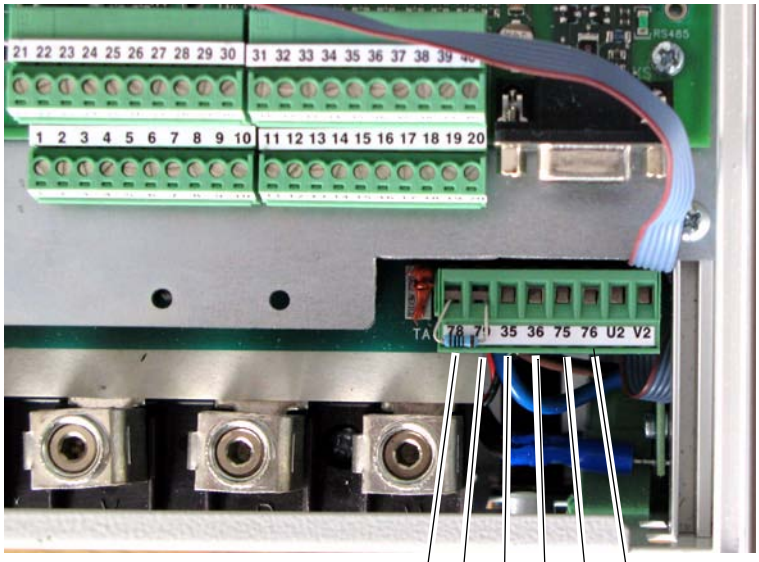
Table 1.I Relay Output Terminal Designations

Terminal	Maximum Voltage	Maximum Current
35 & 36, 75 & 76	250V AC	1A

Table 1.J Recommended Signal Wire Size for Relay Outputs and Thermistor/Thermal Switch Terminals

Signal Type	Terminals	Wire Type and Size			Tightening Torque N-m (lb.-in.)
		Flexible (mm^2)	multi-core (mm^2)	AWG	
Relay Outputs	35 & 36, 75 & 76	0.140 - 1.500	0.140 - 1.500	26-14	0.5 (4.4)
Thermistor and Thermal Switches	78 & 79				

Figure 1.20 Frame A Relay and Thermistor/Thermal Switch Terminal Block Locations



Note: Terminals 78 and 79 shown with 1k ohm resistor in place of temperature sensor.

Figure 1.21 Frame B Relay and Thermistor/Thermal Switch Terminal Block Locations

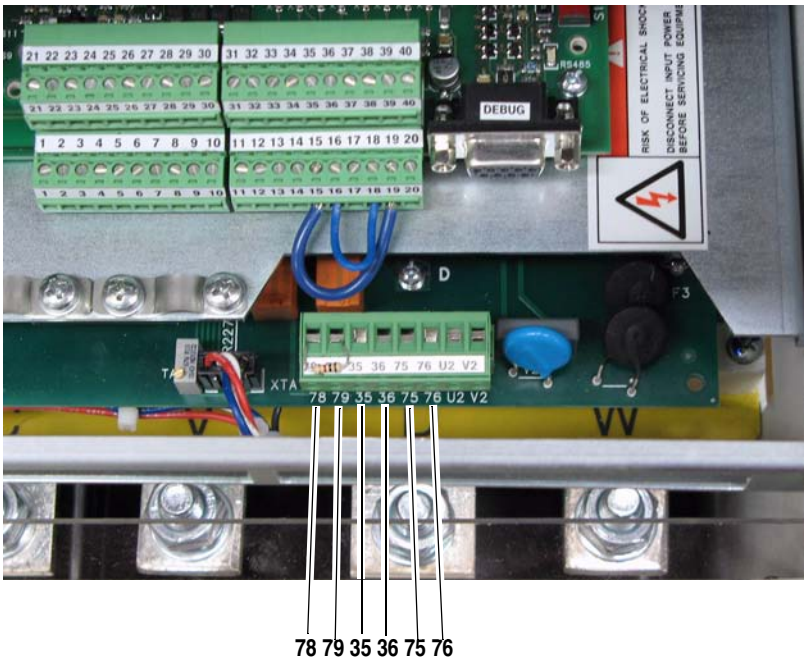
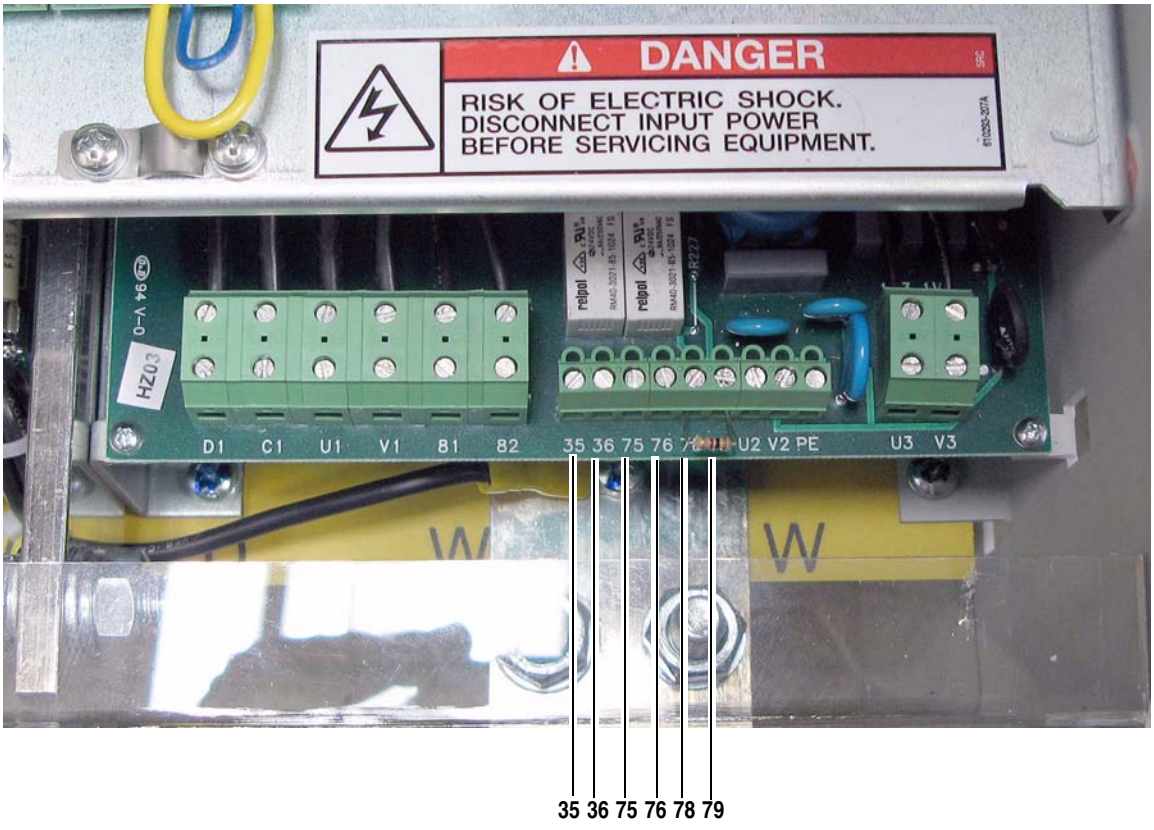


Figure 1.22 Frame C Relay and Thermistor/Thermal Switch Terminal Block Locations


DANGER
RISK OF ELECTRIC SHOCK.
DISCONNECT INPUT POWER
BEFORE SERVICING EQUIPMENT.
D1 C1 U1 V1 B1 B2 35 36 75 76 U2 V2 PE U3 V3
35 36 75 76 78 79

Control Circuit Input Power

The control circuit must be powered by an external 230V AC or 115V AC single phase power supply. For frame B and C drives only, a jumper is required between terminals SA and SB for 115V AC control input power. For frame B drive SA-SB terminal block location, refer to Figure 1.26 on page 1-25. For frame C drive SA-SB terminal block location, refer to Figure 1.27 on page 1-26.

Figure 1.23 Frame A Control Circuit Terminal Block Location

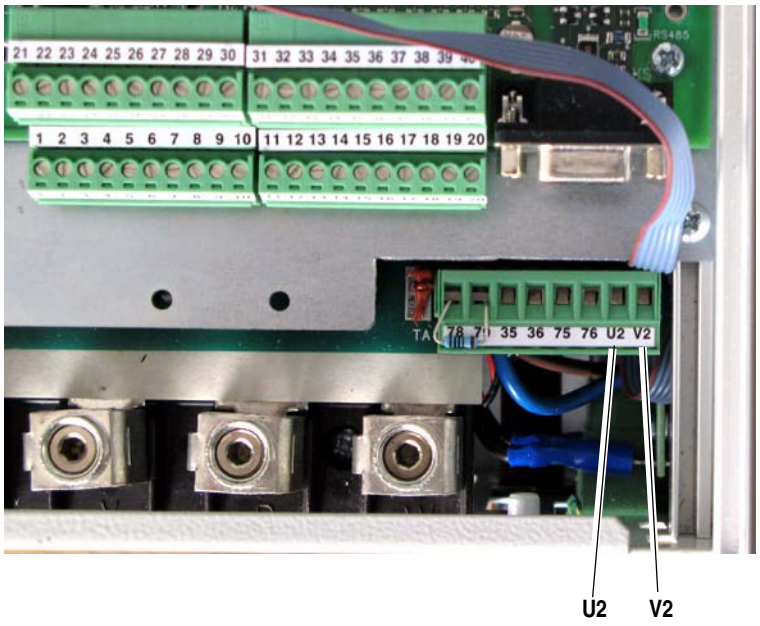


Figure 1.24 Frame B Control Circuit Terminal Block Location

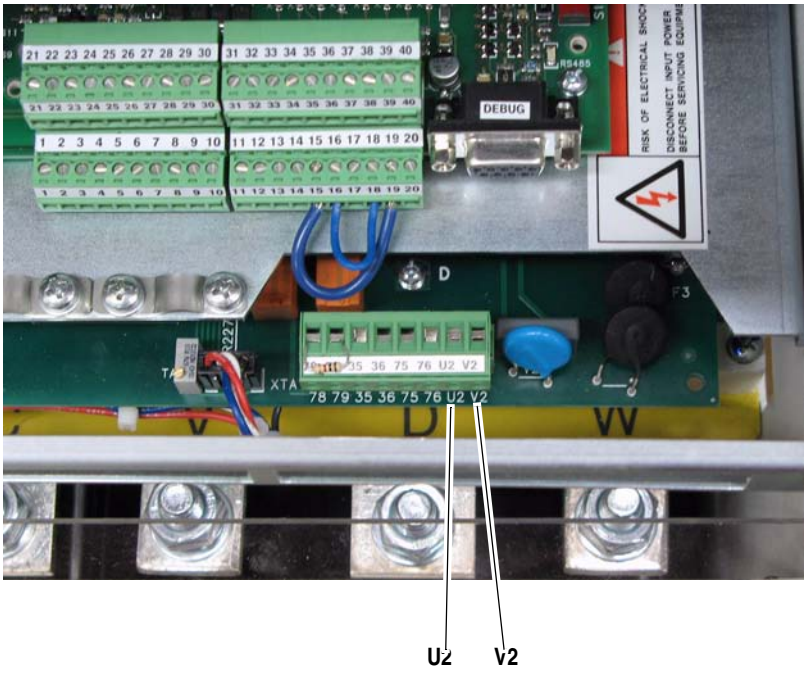


Figure 1.25 Frame C Control Circuit Terminal Block Location

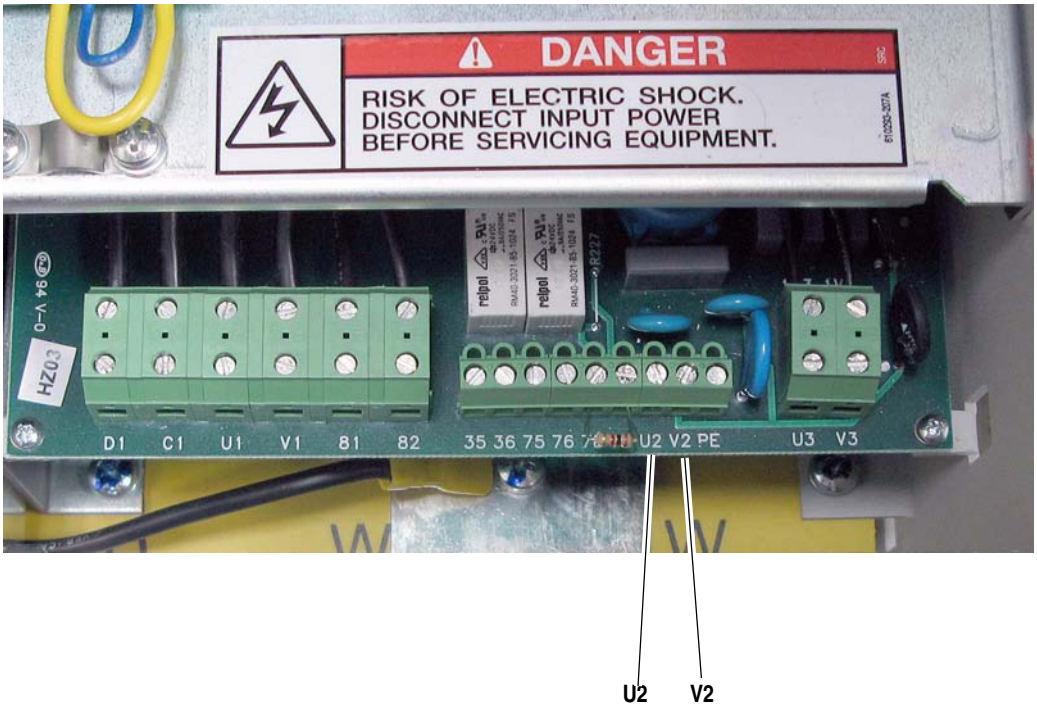

DANGER
RISK OF ELECTRIC SHOCK.
DISCONNECT INPUT POWER
BEFORE SERVICING EQUIPMENT.
D1 C1 U1 V1 81 82 35 36 75 76 U2 V2 PE U3 V3
U2
V2

Table 1.K Control Circuit Wire Sizes

Frame	Drive Current Rating Code(1) 230V	460V	Terminals	Flexible Wire Size (mm^2)	Multi-core Wire Size (mm^2)	AWG	Tightening Torque (N-m / lbs.-in.)
All	All	All	U2, V2	0.14 - 1.5	0.14 - 2.5	26 - 14	0.5 / 4.4

(1) Refer to Catalog Number Explanation on page Preface-4, positions 8-10 for corresponding drive HP rating, armature amp rating and field amp rating.

Figure 1.26 SA-SB Terminal Block Location on Frame B Drives

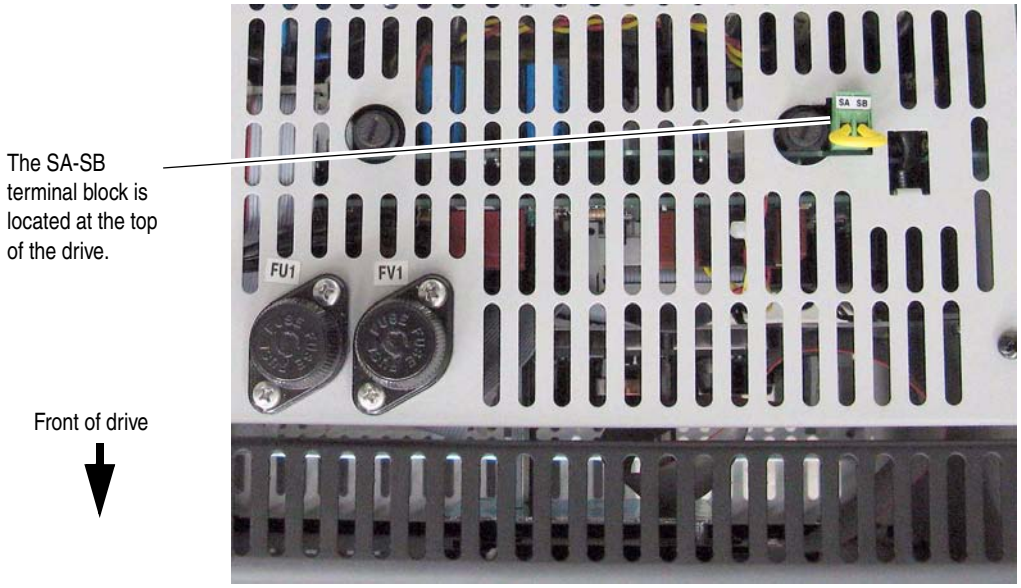
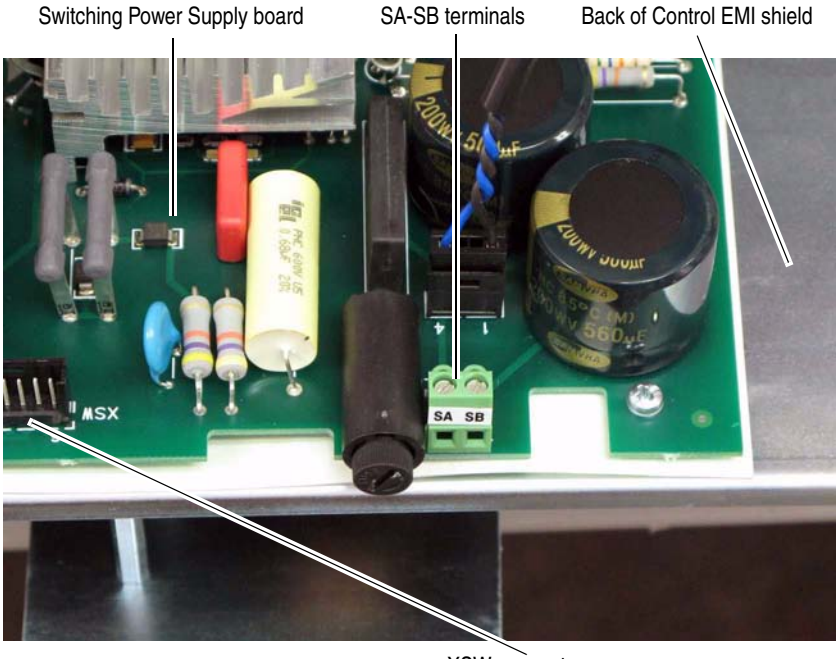


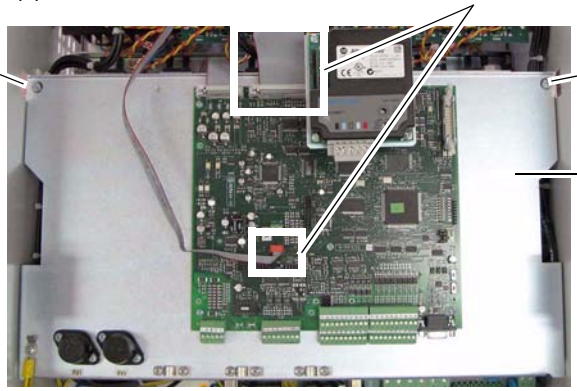
Figure 1.27 SA-SB Terminal Block Location on Frame C Drives

The SA-SB terminal block is located on the Switching Power Supply circuit board on the back of the Control EMI Shield.



To access the SA-SB terminal block:

1. Remove the top protective cover from the drive.
2. Disconnect cables XFCD and XR.
3. Loosen captive screws.
4. Lower EMI shield and disconnect cable XSW from Switching Power Supply board (see above).


3. Loosen captive screws.
3. Loosen captive screws.
4. Lower EMI shield and disconnect cable XSW from Switching Power Supply board (see above).

Frame C Heatsink Cooling Fans and Internal Fuse Signal Terminals

Frame C drives require an external power supply for the heatsink cooling fans and include internal armature circuit protection fuses (drives rated 521A @ 230V AC and 495A and 667A @ 460V AC input only). The terminals for the internal fuses can be used to indicate that the fuses have opened.

Table 1.L Heatsink Cooling Fans and Fuses Terminal Designations

Terminal	Description	Maximum Voltage	Maximum Current
U3 V3	Single-phase input power for cooling fans.	230V AC	1A
81 82	Internal fuse signal.	250V AC	1A

Figure 1.28 Frame C Heatsink Cooling Fan and Internal Fuse Signal Terminal Block Locations

I/O Wiring

Observe the following points when installing I/O wiring:

- Use copper wire only.
- Wire with an insulation rating of 600V or greater is recommended?

Important: I/O terminals labeled "(–)" or "Common" are not referenced to earth ground and are designed to greatly reduce common mode interference. Grounding these terminals can cause signal noise.

ATTENTION: Configuring an analog input for current operation and driving it from a voltage source could cause component damage. Verify proper switch configuration prior to applying input signals. Refer to DIP Switch and Jumper Settings on page 1-28.

ATTENTION: Hazard of personal injury or equipment damage exists when using bipolar input sources. Noise and drift in sensitive input circuits can cause unpredictable changes in motor speed and direction. Use speed command parameters to help reduce input source sensitivity.

DIP Switch and Jumper Settings

DIP switches and jumpers on the regulator circuit board are used to configure the drive for flashing firmware to the control board, the appropriate speed feedback device settings, analog input signals and minimum field current. Most switches and jumpers are set to the appropriate configuration at the factory.

Figure 1.29 Control Circuit Board DIP Switch and Jumper Locations

Refer to Table 1.M on page 1-29 for descriptions corresponding to the ID numbers shown below.

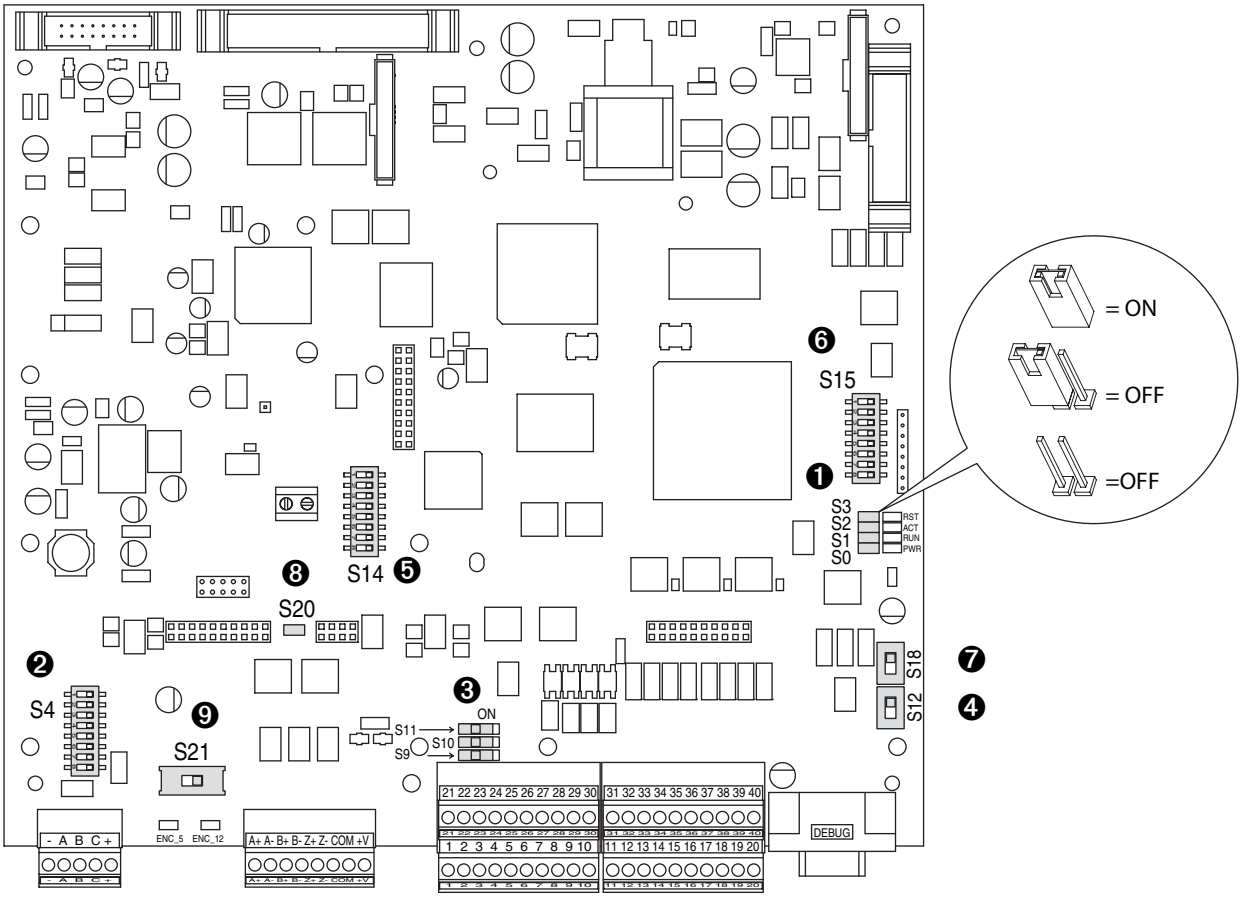
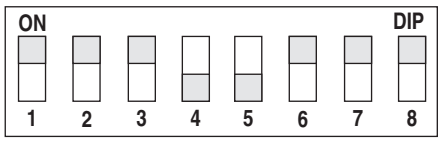


Table 1.M Control Circuit Board Jumper and DIP Switch Settings

ID	Jumper/ Switch	Function	Factory Default
❶	S0	For factory boot flashing only. Leave set to the factory setting. Jumper On Firmware boot Jumper Off Normal function	Jumper Off
	S1	For factory boot flashing only. Leave set to the factory setting. Jumper On Write firmware boot code Jumper Off Boot code on flash is protected	Jumper Off
	S2	Not used. Leave set to the factory setting.	Jumper Off
	S3	For factory boot flashing only. Leave set to the factory setting. Jumper On Reset Jumper Off Normal function	Jumper Off
❷	S4	Configures the input voltage of the DC analog tachometer. Refer to Table 1.N on page 1-30 for configuration.	90V
❸	S9	Configures the input signal of Analog Input 1 (terminals 1 and 2): Off Position 0 - 20 mA / 4 - 20 mA On Position 0 - 10V / ±10V Note: The input signal type must also be programmed accordingly using Par 71 [Anlg In1 Config].	On
	S10	Configures the input signal of Analog Input 2 (terminal 3 and 4): Off Position 0 - 20 mA / 4 - 20 mA On Position 0 - 10V / ±10V Note: The input signal type must also be programmed accordingly using Par 76 [Anlg In2 Config].	On
	S11	Configures the input signal of Analog Input 3 (terminals 5 and 6): Off Position 0 - 20 mA / 4 - 20 mA On Position 0 - 10V / ±10V Note: The input signal type must also be programmed accordingly using Par 81 [Anlg In3 Config].	On
❹	S12	Not used. Leave set to the factory setting.	Off
❺	S14	Field current resistors setting, see Table 1.H on page 1-21. **Important:** In addition, the value selected with switch S14 must be entered in Par 374 [Drv Fld Brdg Cur] in the control software when the drive is commissioned.	Minimum field current rating based on drive size.
❻	S15	Configuration of the control circuit board to the appropriate drive size. Leave set to the factory setting, unless the control board has been supplied as a spare part. Refer to Table 1.O on page 1-30 and Table 1.P on page 1-31 for switch configuration based on drive current rating code.	Armature current based on drive size.
❼	S18	Not used. Leave set to the factory setting.	Off
❽	S20	Monitoring of the Z channel of the Digital Encoder on connector XE2: Off Position Z-channel monitored On Position Z-channel not monitored	On
❾	S21	Encoder power supply voltage and input selection: Note: When control power is supplied to the drive, the appropriate LED lights to indicate the selection of the switch. ENC_5 +5 V encoder (+2.5 - 5.4V input range) ENC_12 +12-15 V encoder (+5.4V - 15.2V input range)	12-15 V

ATTENTION: The Drive can overspeed if DIP switch S4 is set incorrectly, or the tachometer is wired incorrectly. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

Figure 1.30 DC Analog Tachometer DIP Switch S4 Example

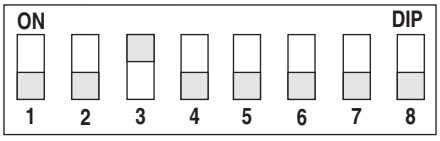


Note: Illustration for example only.

Table 1.N DC Analog Tachometer DIP Switch S4 Configuration

Maximum DC Input Voltage	S4-1 S4-8	S4-2 S4-7	S4-3 S4-6	S4-4 S4-5
22V	ON	ON	ON	ON
45V	ON	ON	ON	OFF
90V	ON	ON	OFF	OFF
180V	ON	OFF	OFF	OFF
300V	OFF	OFF	OFF	OFF

Figure 1.31 Drive Size DIP Switch S15 Example



Note: Illustration for example only.

Table 1.O Drives with 230V Input - DIP Switch S15 Configuration

Frame	Drive Current Rating Code	S15-1	S15-2	S15-3	S15-4	S15-5	S15-6	S15-7	S15-8
A	7P0	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	9P0	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
	012	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
	020	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
	029	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
	038	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
	055	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
	073	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
	093	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
	110	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF
B	146	ON	ON	OFF	ON	OFF	OFF	OFF	OFF
	180	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
	218	ON	OFF	ON	ON	OFF	OFF	OFF	OFF
	265	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
	360	ON	ON	ON	ON	OFF	OFF	OFF	OFF
	434	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
C	521	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF

Table 1.P Drives with 460V Input - DIP Switch S15 Configuration

Frame	Drive Current Rating Code	S15-1	S15-2	S15-3	S15-4	S15-5	S15-6	S15-7	S15-8
A	4P1	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
	6P0	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF
	010	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF
	014	ON	ON	OFF	OFF	OFF	OFF	ON	OFF
	019	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF
	027	ON	OFF	ON	OFF	OFF	OFF	ON	OFF
	035	OFF	ON	ON	OFF	OFF	OFF	ON	OFF
	045	ON	ON	ON	OFF	OFF	OFF	ON	OFF
	052	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF
	073	ON	OFF	OFF	ON	OFF	OFF	ON	OFF
	086	OFF	ON	OFF	ON	OFF	OFF	ON	OFF
	100	ON	ON	OFF	ON	OFF	OFF	ON	OFF
	129	OFF	OFF	ON	ON	OFF	OFF	ON	OFF
B	167	ON	OFF	ON	ON	OFF	OFF	ON	OFF
	207	OFF	ON	ON	ON	OFF	OFF	ON	OFF
	250	ON	ON	ON	ON	OFF	OFF	ON	OFF
	330	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF
	412	ON	OFF	OFF	OFF	ON	OFF	ON	OFF
C	495	OFF	ON	OFF	OFF	ON	OFF	ON	OFF
	667	ON	ON	OFF	OFF	ON	OFF	ON	OFF

I/O Signal and Control Wiring

Eight (8) digital inputs, four (4) digital outputs, three (3) analog inputs, and two (2) analog outputs are available on the standard I/O terminal blocks provided with the drive. One digital input (1-8) must be configured for "Enable".

Additional digital and analog I/O is available when using the optional I/O Expansion circuit board. Refer to Appendix F Optional Analog and Digital I/O Expansion Circuit Board for more information. Also, you can use the optional 115V AC Converter circuit board to convert 115V AC digital input signals to 24V DC digital inputs signals to interface with the digital inputs on the standard I/O terminal blocks. Refer to Appendix G Optional 115V AC to 24V DC I/O Converter Circuit Board for more information.

Table 1.Q Recommended Signal Wire Size for Analog I/O, Digital I/O and DC Analog Tachometer

Signal Type	Terminal Block (Terminals)	Wire Type and Size			Tightening Torque N-m (lb.-in.)
		Flexible (mm^2)	multi-core (mm^2)	AWG	
Analog and Digital I/O	TB1 - 4 (1 - 40)	0.140 - 1.500	0.140 - 1.500	26-16	0.4 (3.5)
DC Analog Tach	M3 (+ and –)				

Figure 1.32 I/O Terminal Block Locations

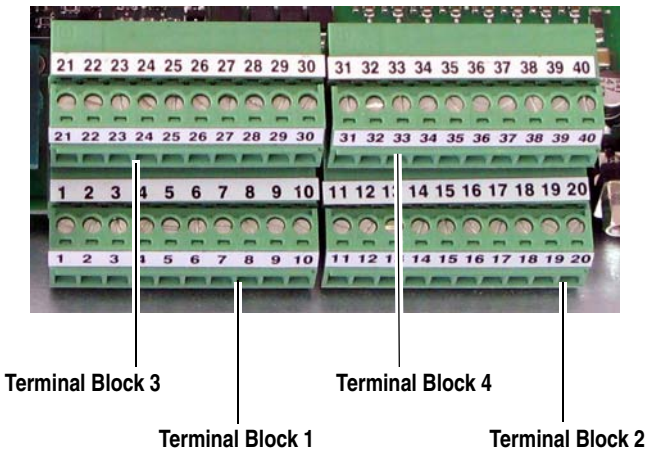
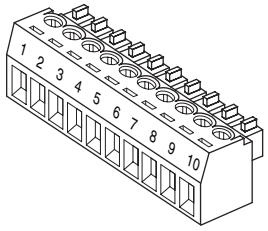
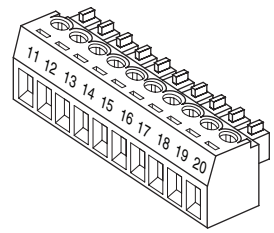


Table 1.R I/O Terminal Block 1 Designations

	No.	Signal	Description	Factory Default	Config. Parameter
	1	Analog Input 1 (+)	Isolated[1], bipolar, differential ±10V / 0-20mA or 4-20mA. **Important:** 0-20mA or 4-20mA operation requires that switch S9, S10, and S11 on the Control board be in the "Off" position. Drive damage may occur if the switch is not in the correct position based on the type of input signal. Refer to Table 1.M on page 1-29. Max ±10V, Max 0.25mA.	1 "Speed Ref A"	70 [Anlg In1 Sel]
	2	Analog Input 1 (–)			
	3	Analog Input 2 (+)		0 "Off"	75 [Anlg In2 Sel]
	4	Analog Input 2 (–)			
	5	Analog Input 3 (+)		0 "Off"	80 [Anlg In3 Sel]
	6	Analog Input 3 (–)			
	7	+10V Pot Reference	2-5k ohm load. Max ±10V, 10mA.	–	–
	8	–10V Pot Reference			
	9	Pot Common	For (+) and (–) 10V pot references.	–	–
	10	PE ground	PE ground to drive chassis.	–	–

(1) Differential Isolation - External source must be maintained at less than 160V with respect to PE. Input provides high common mode immunity.

Table 1.S I/O Terminal Block 2 Designations

	No.	Signal	Description	Factory Default	Config. Parameter
	11	Internal 0V (Gnd)		–	–
	12	Digital Input 1	Max +30V, 15V/3.2mA, 24V/5mA, and 30V/6.4mA.	2 "Stop/CF"	133 [Digital In1 Sel]
	13	Digital Input 2		3 "Start"	134 [Digital In2 Sel]
	14	Digital Input 3		11 "Jog"	135 [Digital In3 Sel]
	15	Digital Input 4		1 "Enable"[1]	136 [Digital In4 Sel]
	16	Digital Input Common[2]		–	–
	17	Not Used		–	–
	18	24V Supply Common	Common for the internal power supply.	–	–
	19	+24V DC Supply	Drive supplied control input power. Max. +20-30V, 200mA[3]	–	–
	20	PE ground	PE ground to drive chassis.	–	–

(1) A digital input (1-8) must be configured for "Enable".

(2) When using the internal +24V DC supply (terminal 19) for digital inputs 1-4, you must connect the digital input common (terminal 16) to the +24V supply common (terminal 18).

(3) The total current draw is the sum of encoder power, digital outputs and any other loads connected to terminal 19.

Table 1.T I/O Terminal Block 3 Designations

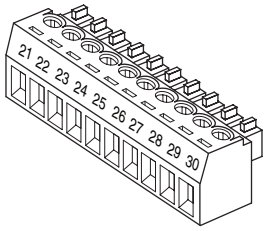
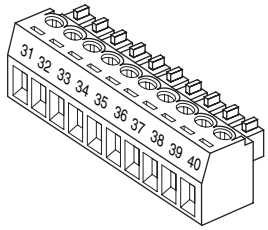
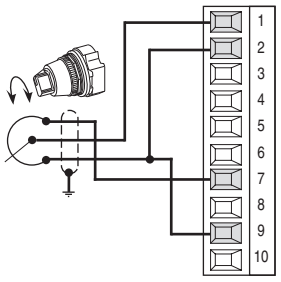
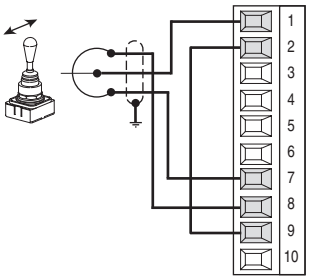
	No.	Signal	Description	Factory Default	Config. Parameter
	21	Analog Output 1 (+)	Max. ±10V, 5 mA.	12 “Motor Speed”	66 [Anlg Out1 Sel]
	22	Analog Output 1 (–)			
	23	Analog Output 2 (+)		13 “Motor Curr”	67 [Anlg Out2 Sel]
	24	Analog Output 2 (–)			
	25	Digital Output Common		–	–
	26	Digital Output 1	Max. +30V, 50mA	5 “Ready”	145 [Digital Out1 Sel]
	27	Digital Output 2		9 “Fault”	146 [Digital Out2 Sel]
	28	Digital Output 3		2 “Spd Thresh”	147 [Digital Out3 Sel]
	29	Digital Output 4		4 “CurrentLimit”	148 [Digital Out4 Sel]
	30	External +24V DC Supply	Supply voltage for the Digital Outputs. Max. +30V DC, 80mA.	–	–

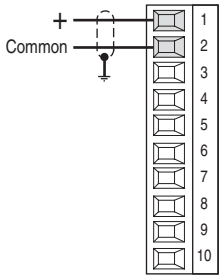
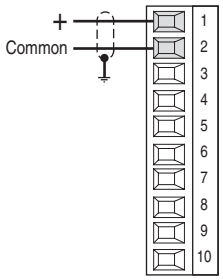
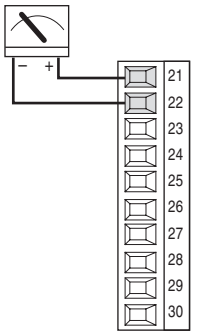
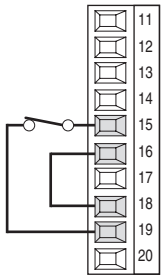
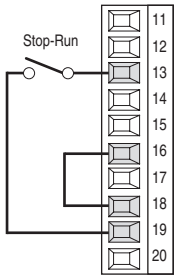
Table 1.U I/O Terminal Block 4 Designations

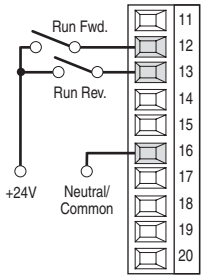
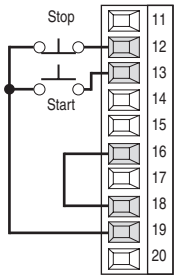
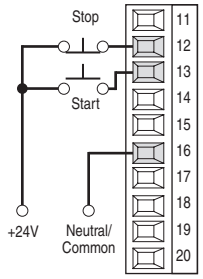
	No.	Signal	Description	Factory Default	Config. Parameter
	31	Digital Input 5	Max +30V, 15V/3.2mA, 24V/5mA, and 30V/6.4mA.	17 “Speed Sel 1”	137 [Digital In5 Sel]
	32	Digital Input 6		18 “Speed Sel 2”	138 [Digital In6 Sel]
	33	Digital Input 7		19 “Speed Sel 3”	139 [Digital In7 Sel]
	34	Digital Input 8		31 “Contactor”	140 [Digital In8 Sel]
	35	Digital Input Common(1)		–	–
	36-40	Not Used		–	–

(1) When using the internal +24V DC supply (terminal 19) for digital inputs 5-8, you must connect the digital input common (terminal 35) to the +24V supply common (terminal 18).

I/O Wiring Examples

Input/Output	Connection Example	Required Parameter Changes
Potentiometer Unipolar Speed Reference 10k Ohm Pot. Recommended (2k Ohm Minimum)		• Adjust Scaling: 72 [Anlg In1 Scale] and 73 [Anlg1 Tune Scale] • View Signal Value: 1404 [Analog In1 Value] • View Signal Output: 385 [Speed Ref Out]
Joystick Bipolar Speed Reference (1) ±10V Input		• Set Direction Mode: 1322 [Direction Mode] = 1 “Bipolar” • Adjust Scaling: 72 [Anlg In1 Scale] and 73 [Anlg1 Tune Scale] • View Signal Value: 1404 [Analog In1 Value] • View Signal Output: 385 [Speed Ref Out]

Input/Output	Connection Example	Required Parameter Changes
Analog Input Bipolar Speed Reference (1) ±10V Input		• Set Direction Mode: 1322 [Direction Mode] = 1 “Bipolar” • Adjust Scaling: 72 [Anlg In1 Scale] and 73 [Anlg1 Tune Scale] • View Signal Value: 1404 [Analog In1 Value] • View Signal Output: 385 [Speed Ref Out]
Analog Input Unipolar Speed Reference 0 to +10V Input or 0 to 20 mA		• Configure for Voltage or Current: 71 [Anlg In1 Config](3) • Adjust Scaling: 72 [Anlg In1 Scale] and 73 [Anlg1 Tune Scale] • View Signal Value: 1404 [Analog In1 Value] • View Signal Output: 385 [Speed Ref Out]
Analog Output Bipolar Signal ±10V Bipolar (based on the signal of the selected input (i.e., selection “Analog In 1”) 0-10V/0-20mA Unipolar *(shown)*		• Select Source Value: 66 [Anlg Out1 Sel] • Adjust Scaling: 62 [Anlg Out1 Scale]
Enable Input 24V DC internal supply		• No Changes Required. Note: If the digital input used for “Enable” is changed from the default setting of digital input 4, the wiring must be changed accordingly.
2-Wire Control Non-Reversing(2) 24V DC internal supply		• Disable Digital Input 1: 133 [Digital In1 Sel] = 0 “Not Used” • Set Digital Input 2: 134 [Digital In2 Sel] = 5 “Run”

Input/Output	Connection Example	Required Parameter Changes
2-Wire Control Reversing(2) 24V DC external supply		• Set Digital Input 1: 133 [Digital In1 Sel] = 6 “Run Forward” • Set Digital Input 2: 134 [Digital In2 Sel] = 7 “Run Reverse”
3-Wire Control 24V DC internal supply		• No Changes Required.
3-Wire Control 24V DC external supply Requires 3-wire functions only ([Digital In1 Sel]). Using 2-wire selections will cause a type 2 alarm (page page 4-7).		• No Changes Required

(1) Refer to the Attention statement on page 1-27 for important bipolar wiring information.

(2) **Important:** Programming inputs for 2 wire control deactivates the HIM Start and Jog buttons.

(3) 0-20mA or 4-20mA operation requires that the switch at S9, S10, or S11 be set to the “ON” position or drive damage may occur. Refer to Table 1.M on page 1-29.

Digital Encoder Terminal Block

The encoder connection cables should always be connected directly to the terminals on the encoder terminal block. The encoder cable must be made up of twisted pairs with the shield connected to the shield ground on the drive side. Do not connect the shield to ground on the motor side. In some cases (i.e., cable lengths that exceed 100 meters), it may be necessary to ground the shield of each twisted pair on the power supply. Refer to page A-3 for Digital Encoder specifications.

Figure 1.33 Digital Encoder Terminal Block Location

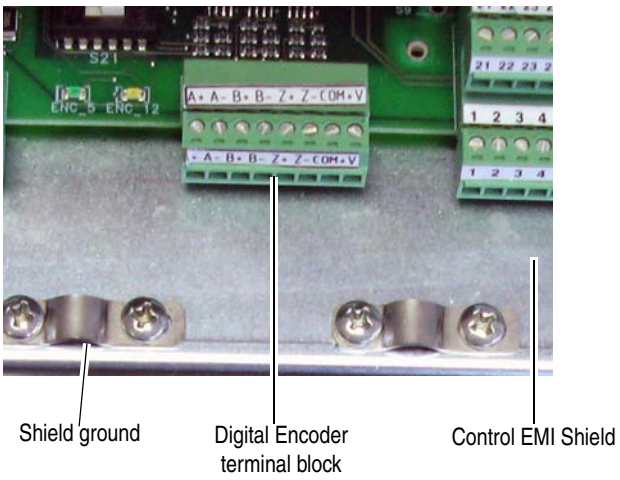
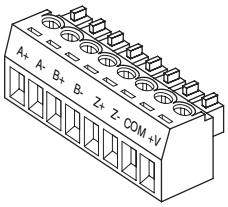


Table 1.V Digital Encoder Terminal Designations

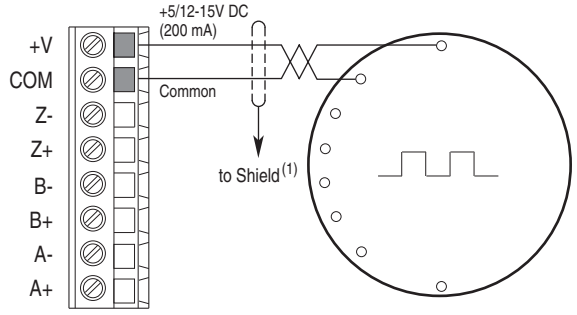
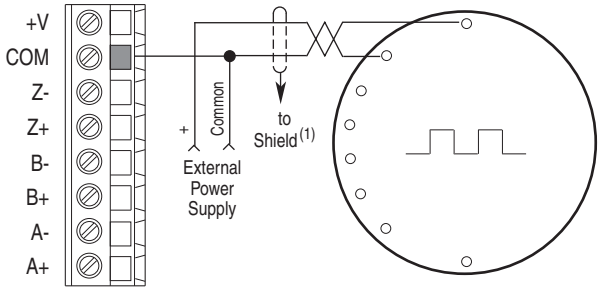
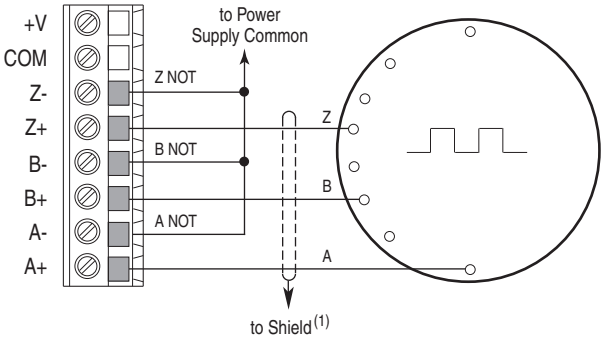
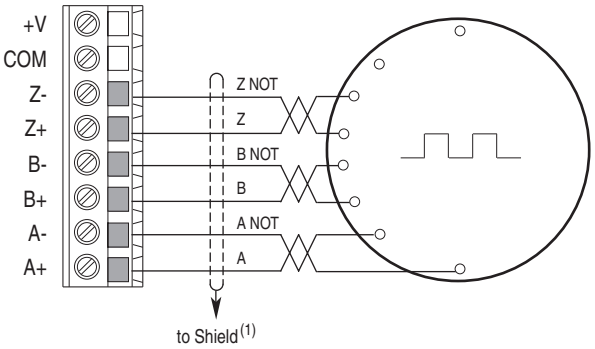


No.	Description	
A+	Encoder A	Single channel or quadrature A input
A-	Encoder A (NOT)	
B+	Encoder B	Dual channel quadrature B input
B-	Encoder B (NOT)	
Z+	Encoder Z	Pulse, marker or registration input(2)
Z-	Encoder Z (NOT)	
COM	+5/12-15V(1) DC Return	Internal power common
+V	+5/12-15V(1) DC Power	Internal power source 200 mA

(1) Selectable via switch S21 on the Control board. Refer to Table 1.M on page 1-29.

(2) Selectable via switch S20 on the Control board. Refer to Table 1.M on page 1-29.

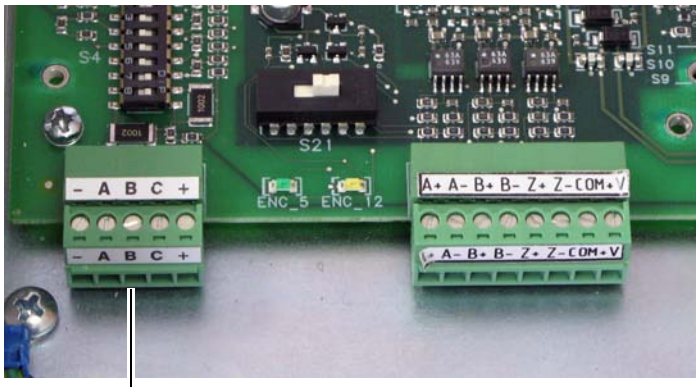
Figure 1.34 Sample Encoder Wiring

I/O	Connection Example
Encoder Power – [1] Internal Drive Power Internal (drive) +5/12-15V DC, 200mA	
Encoder Power –External Power Source	
Encoder Signal – Single-Ended, Dual Channel	
Encoder Signal –Differential, Dual Channel	

(1) Shield connection is on drive Control EMI shield. Refer to Figure 1.33 on page 1-36.

DC Analog Tachometer Terminal Block

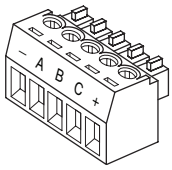
Figure 1.35 Analog Tachometer Terminal Block Location



Refer to page A-3 for DC Analog Tachometer specifications.

ATTENTION: The Drive can overspeed if DIP switch S4 is set incorrectly, or the tachometer is wired incorrectly. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

Table 1.W DC Analog Tachometer Terminal Designations

	No.	Signal	Description
	–	Negative input	–
	A	(Not Used)	
	B		
	C		
	+	Positive input Clockwise rotation = positive Counterclockwise rotation = negative	22.7 / 45.4 / 90.7 / 181.6 / 302.9V(1) max voltage 8 mA max. current

(1) Maximum voltage depends on the configuration of DIP switch S4. Refer to DC Analog Tachometer DIP Switch S4 Example on page 1-30

Drive Start Up

This chapter describes how to start up the PowerFlex DC drive. The drive is configured at the factory for speed regulation with encoder feedback and independant motor field current regulation with constant current to control the motor from zero to base speed.

If using the LCD HIM (Human Interface Module) to commission the drive, it is recommended that you read Appendix B before performing these procedures.

ATTENTION: Power must be applied to the drive to perform the following start-up procedure. Some of the voltages present are at incoming line potential. To avoid electric shock hazard or damage to equipment, only qualified service personnel should perform the following procedure. Thoroughly read and understand the procedure before beginning. If an event does not occur while performing this procedure, **Do Not Proceed**. **Remove Power** including user supplied control voltages. Correct the malfunction before continuing.

Important: It is recommended that you uncouple the motor from all loads at this time, until otherwise directed.

Drive Start Up Checklist

This checklist contains the major steps required to complete the drive commissioning procedure.

- ❏ 1. Verify all Drive Configuration Settings - page 2-2.
- ❏ 2. Verify the Power Wiring - page 2-2.
- ❏ 3. Verify the Control and I/O Wiring - page 2-2.
- ❏ 4. Apply Voltage to the Control Circuits - page 2-3.
- ❏ 5. Verify the Control Voltages - page 2-4.
- ❏ 6. Load the Default Settings - page 2-5.
- ❏ 7. Configure the Most Commonly Used Parameters - page 2-5.
- ❏ 8. Tune the Current Regulator - page 2-8.
- ❏ 9. Verify Motor Rotation and Run Feedback Polarity Checks - page 2-9.
- ❏ 10. Configure the Speed Feedback Parameters - page 2-12.
- ❏ 11. Tune the Speed Regulator - page 2-13.
- ❏ 12. Verify Speed Reference Settings and Drive Operation - page 2-14.

Before Applying Power to the Drive

1. Verify all Drive Configuration Settings:

   1. With the bottom cover removed from the drive (refer to Removing the Drive Covers on page 1-7), verify that DIP switch S14 is set correctly to be ≥ the rated field current specified on the motor nameplate. Refer to Table 1.H on page 1-21.

   2. Verify all switch settings (S9, S10, and S11) for the analog inputs. Refer to Table 1.M on page 1-29.

   3. Verify all DIP switch and jumper settings for the digital encoder or analog tachometer feedback device. Refer to Table 1.M on page 1-29 and Figure 1.30 on page 1-30.

ATTENTION: The Drive can overspeed if DIP switch S4 is set incorrectly, or the tachometer is wired incorrectly. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

2. Verify the Power Wiring:

   Verify that the AC line power at the disconnect device is within the rated value of the drive and that all power wiring is correct. Refer to Power Wiring on page 1-12 for further information.

ATTENTION: Do not connect any external power to the armature output terminals, personal injury and/or equipment damage can occur.

3. Verify the Control and I/O Wiring:

   1. Verify that control power and I/O wiring is correct. A digital input (1-8 only) must be wired and configured as a drive enable. Refer to Control Circuit Input Power on page 1-24 and I/O Wiring on page 1-27 for further information.

   2. If you are using a PTC thermistor or thermal switch to protect the motor from overloading, remove the 1k ohm resistor between terminals 78 and 79. Refer to Thermistors and Thermal Switches on page 1-21

Applying Power to the Drive

The remainder of the "Drive Start Up" procedure in this manual uses a HIM to configure and autotune the drive. If you prefer, you can use the DriveExplorer™ or DriveTools™ SP software[1] to program drive parameters or use the drive "Start Up" wizard available with both software packages.

If an operator interface is not available, remote devices should be used to start up the drive. For information on using the HIM, refer to the HIM Overview on page B-1.

Important: When power is first applied, the HIM may require approximately 5 seconds until commands are recognized (including the Stop key).

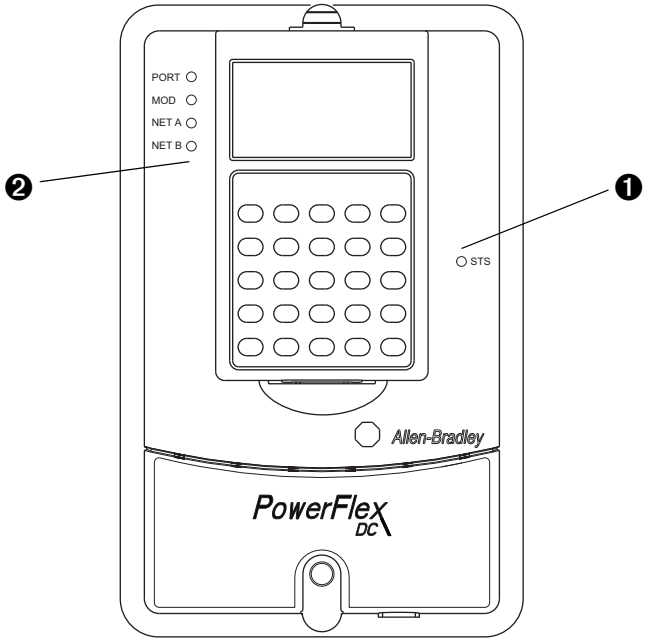
4. Apply Voltage to the Control Circuits:

   1. Apply power to the control circuits (terminals U2 and V2) of the drive. If any of the digital inputs are configured to "Stop/CF" (CF = Clear Fault), "Enable" or "Aux Fault," verify that signals are present or reconfigure [Digital Inx Sel]. If a fault code appears, refer to Chapter 4 - Troubleshooting on page 4-1.

   2. If the STS LED is not flashing green at this point, refer to "Drive Status Indicators" below.

[1] You must use DriveExplorer v5.02 or higher or DriveTools SP v4.01 or higher with a PowerFlex DC drive specific software patch. The patch can be downloaded from http://www.ab.com/support/abdrives/webupdate/

Figure 2.1 Drive Status Indicators



#	Name	Color	State	Description
❶	STS (Status)	Green	Flashing	Drive ready, but not running and no faults are present.
			Steady	Drive running, no faults are present.
		Yellow	Flashing, Drive Stopped	A condition exists that is preventing the drive from starting. Check parameters 1403 [Start Inhibits] and/or 1380 [Drive Alarm 1].
			Flashing, Drive Running	An intermittent type 1 alarm condition is occurring. Check parameter 1380 [Drive Alarm 1]. Refer to Fault Descriptions on page 4-4 and/or Alarm Descriptions on page 4-7.
			Steady, Drive Running	A continuous type 1 alarm condition exists. Check parameter 1380 [Drive Alarm 1]. Refer to Fault Descriptions on page 4-4 and/or Alarm Descriptions on page 4-7.
		Red	Flashing	A fault has occurred. Check [Fault x Code] or view the Fault Queue on the HIM. Refer to Fault Descriptions on page 4-4.
			Steady	A non-resettable, non-configurable fault has occurred. Check [Fault x Code] or view the Fault Queue on the HIM. Refer to Fault Descriptions on page 4-4.
❷	PORT	Refer to the Communication Adapter User Manual.		Status of DPI port internal communications (if present).
	MOD			Status of communications module (when installed).
	NET A			Status of network (if connected).
	NET B			Status of secondary network (if connected).

5. Verify the Control Voltages:

❑ Verify that the following voltages are present at I/O terminal block 1 and 2. Refer to I/O Signal and Control Wiring on page 1-31:

Terminal Number . . .	Voltage	to Terminal Number . . .
7	+10V	9
8	-10V	9
19	+24 - 30V	18

6. Load the Default Settings:

   It is recommended that you reset the drive to the default settings. By resetting the drive to the default settings, any previous parameter modifications you have made will be overwritten.

   1. On the HIM, from the “Main” menu scroll to the “Memory Storage” menu and press Enter.

   2. Scroll to “Reset To Defaults” and press Enter. A message displays to verify that you want to reset the drive to the factory settings.

   3. Press Enter.

   Note: A “Params Defaulted” (F48) entry will be made in the drive’s Fault Queue to indicate the change.

7. Configure the Most Commonly Used Parameters:

   If your application only requires basic drive parameter set up, you can use the S.M.A.R.T. list screen available on the HIM to program the drive. Refer to Using the S.M.A.R.T. List Screen on page B-2 for more information.

   1. At the Main menu, scroll to the Parameter option and press Enter.

   2. Scroll to the “FGP” menu and press Enter.

   3. Scroll to the “Motor Control” file and press Enter.

   4. With the “Motor Data” group selected, press Enter and configure the following parameters:

   - ❏ 45 [Max Ref Speed] - Enter the motor nameplate base speed. If the application requires field weakening to operate above base speed, enter the maximum reference speed required.
   - ❏ 162 [Max Feedback Spd] - Enter the motor nameplate base speed. If the application requires field weakening to operate above base speed, enter the maximum feedback speed that could be encountered.
   - ❏ 175 [Rated Motor Volt] - Enter the rated motor nameplate armature voltage. This value should be the measured armature voltage when the motor is running at base speed with rated field current. This value should represent 100% of the rated armature voltage when field weakening is not used. If field weakening is used, this value should be set to 90% of the rated armature voltage to prevent a possible overvoltage condition when the drive transitions to the field weakening mode.

- ❏ 179 [Nom Mtr Arm Amps] - Enter the rated motor nameplate armature current.
- ❏ 280 [Nom Mtr Fld Amps] - Enter the rated motor nameplate field current.
- ❏ 374 [Drv Fld Brdg Cur] - Enter the rated current of the field bridge regulator to match the value set using the DIP switch S14. Refer to Field Current Resistors on page 1-20.

5. Access the “Field Config” group and configure the following parameters:

- ❏ If the motor field power is supplied by an external source, set Par 497 [Field Reg Enable] = 0 “Disabled”. Otherwise, verify that this parameter is set to 1 “Enabled” (default).
- ❏ If you are utilizing field economy when the drive is stopped or at zero speed, set Par 1407 [Field Econ Delay] to the desired amount of time to elapse after the drive stops or reaches zero speed before field economy becomes active (the value set in Par 468 [Min Fld Curr Pct]). The default value is 300 seconds.
- ❏ Par 469 [Field Mode Sel] - select the desired field mode (default = 0 “Base Speed”, constant field current):
  - ❍ 1 “Field Weaken”, field weakening mode
  - ❍ 2 “External”, power to the field is supplied externally
- ❏ If you are utilizing field economy at zero speed, set 468 [Min Fld Curr Pct] to the desired minimum field current for field economy (default = 30%).
- ❏ If you are operating the drive in field weakening mode, set Par 456 [Fld Weaken Ratio] = Motor nameplate base speed / Par 45 [Max Ref Speed] x 100.

Important: When operating the drive in field weakening mode, it is necessary to refer to the CEMF value or to the crossover data. If the maximum field current is not within 10% of the maximum value of the internal field converter, configure the current feedback using DIP switch S14. Refer to Field Current Resistors on page 1-20.

6. Access the “Utility” file and press Enter.

7. Access the “Alarms” group and configure the following parameters:

   - ❏ Par 481 [UnderVolt Thresh] - Enter the value at which a drive under voltage condition will be detected (default = 230V).

   - ❏ Par 584 [OverCurrent Thr] - Enter the value at which a drive over current condition will be detected (default = 175%). The threshold level should be at least 10% above the selected operating current limit (Par 7 [Current Limit]).

8. Access the “Input & Output” file and press Enter.

9. Access the “Analog Inputs” group and configure the following:

   - ❏ If you have connected a potentiometer to analog input 1 for a speed reference:

     - ❍ Verify that Par 70 [Anlg In1 Sel] is set to 1 “Speed Ref A” (default).

     - ❍ Verify that switch S9 and Par 71 [Anlg In1 Config] are configured to match (voltage versus a current signal). Refer to DIP Switch and Jumper Settings on page 1-28.

     - ❍ Set Par 72 [Anlg In1 Scale] and Par 74 [Anlg In1 Offset] appropriately.

   - ❏ If you are using the HIM on the drive cover (Port 1) for the speed reference, set Par 70 [Anlg In1 Sel] to 0 “Off”.

10. Access the “Digital Inputs” group and configure the following parameters:

    - ❏ Par 1391 [ContactorControl] - Select the type of contactor(s) used with the drive: 1 “Contactor” (default, AC input or DC output contactor), 2 “Contactor+DB” (AC input or DC output contactor and dynamic brake contactor), or 0 “None”.

      Note: If you select 0 “None” for Par 1391 [ContactorControl], a “CntactrCflct” alarm will display. The alarm will be resolved and automatically clear when you complete the Digital Output configuration below.

      Note: If Par 1391 [ContactorControl] is set to 1 or 2, an Auxiliary Status contactor must be wired to a digital input (default for digital input 8).

    - ❏ Par 140 [Digital In8 Sel] - If a contactor is NOT used, set to other than 31 “Contactor” (e.g., 0 “Not Used”).

    - ❏ If an auxiliary status contactor is wired to a digital input, set the appropriate [Digital Inx Sel] parameter to 31 “Contactor”.

11. Access the “Digital Outputs” group and configure the following parameters:

- ❑ If a contactor and a dynamic brake resistor is used:
  - ❍ Par 629 [Relay Out 2 Sel] = 24 “ContactorDB”.
- ❑ If a neither a contactor and a dynamic brake resistor is used:
  - ❍ Par 629 [Relay Out 2 Sel] = Set to other than 24 “ContactorDB” or 25 “Contactor” (e.g., 0 “Not Used”).
  - ❍ Par 1392 [Relay Out 1 Sel] = Set to other than 24 “ContactorDB” or 25 “Contactor” (e.g., 0 “Not Used”).

12. If you are using the HIM on the drive cover (Port 1) for the speed reference, access the “DPI Inputs” group and set the appropriate [DPI Px Select] parameter to 1“Speed Ref A”.

8. Tune the Current Regulator:

Complete this test before running the drive for the first time. Upon completing this tuning procedure, the armature resistance value is stored in Par 453 [Arm Resistance] and the armature inductance value is stored in Par 454 [Arm Inductance]. If needed, these values can be manually adjusted.

1. If an external supply is used to power the motor field, disconnect the wires from the motor field terminals. If the drive supplies power to the motor field, the internal field circuit will automatically be disabled during this test.

Important: The drive must be under at least a 40% load in order to properly tune the current regulator. Verify that the motor does not start rotating during the Current Regulator tuning test (due to remnant magnetization, field series, etc.). If necessary, mechanically block the motor shaft so it does not turn.

2. Access the “Motor Control” file, the “Torq Attributes” group and set Par 7 [Current Limit] to the appropriate level for your application. This parameter defaults to 150%. The drive’s armature output current will correspond to Par 179 [Nom Mtr Arm Amps] x Par 7 [Current Limit].

Note: Par 8 [Current Lim Pos], the drive current limit for the positive direction and Par 9 [Current Lim Neg], the drive current limit for the negative direction, are set to 150% by default. If necessary, you can change the value of these parameters to suit your application.

3. Access the “Speed Feedback” group and verify that Par 414 [Fdbk Device Type] is set to 3 “Armature” (default).

4. Press the Esc key until you return to the “File” menu and access Par 452 [CurrReg Autotune] in the “Autotune” group, in the “Motor Control” file, and select 1 “On” and press Enter.

5. Press the Start button on the HIM. This will start the current regulator auto tuning test, which could take several minutes.

   At the end of the test, the drive will automatically be stopped and Par 452 [CurrReg Autotune] will be set to 0 “Off”.

If the value of Par 587 [I Reg Error] is greater than -/+40, refer to Manually Adjusting the Current Regulator Tune Settings on page C-22 for more information.

If a drive fault occurs during the tuning procedure, refer to Fault Descriptions on page 4-4 for a list of fault descriptions and actions.

9. Verify Motor Rotation and Run Feedback Polarity Checks:

The jog function (on the HIM or terminal block) will be used to check motor direction and encoder operation. If the STS LED is not flashing green at this point, refer to Figure 2.1 on page 2-4 for more information.

ATTENTION: Prior to running the motor direction and polarity checks, you must provide a hard wired maintained external operator accessible coast/stop push button to disable the machine in case of improper operation. Uncontrolled machine operation can result if this is not done. Failure to observe this precaution could result in severe bodily injury or loss of life.

ATTENTION: Prior to running the motor direction and polarity checks, uncouple the motor from equipment or processes that may be damaged by incorrect rotation of the motor or speed references.

1. When checking motor polarity, the drive will have power applied and the motor will rotate. Verify that the motor is uncoupled from the load. If the motor cannot be uncoupled from the load, the following motor checks are recommended:

   ❏ All electrical connections are tight.

   ❏ The brushes are properly seated.

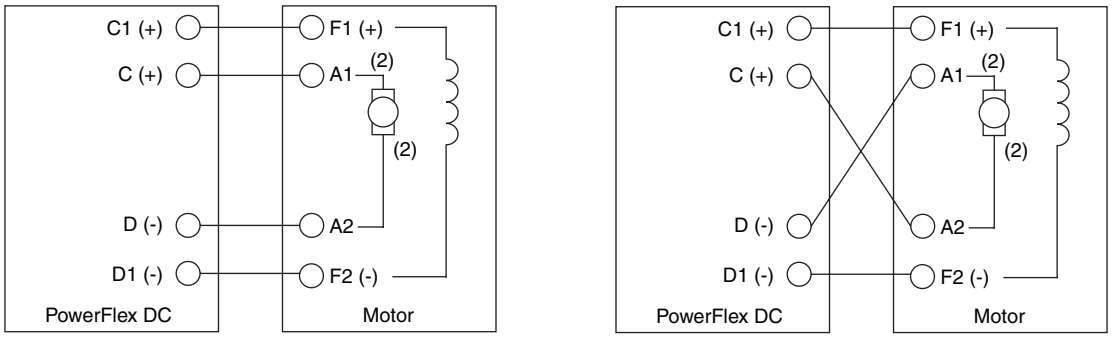
   ❏ The motor shaft is free to rotate.

2. Access the “Motor Control” file, “Speed Feedback” group and verify that Par 414 [Fdbk Device Type] is set to 3 “Armature” (default).

3. Access the “Speed Command” file, “Discrete Speeds” group and verify that Par 266 [Jog Speed] is set to the default value (100 RPM) or to an acceptable speed level for this test.

4. If analog input 1 is wired, access the “Analog Inputs” group and verify that the voltage level is 0V in Par 1404 [Analog In1 Value].
5. While viewing Par 233 [Output Voltage], assert a Jog command (via the HIM keypad or digital input on the I/O terminal block) and observe the motor rotation direction. Verify whether or not Par 233 [Output Voltage] is positive.
6. If the observed rotation direction is incorrect, remove power from the drive and continue with step 6 below, while referring to the motor connection diagrams in Figure 2.2 below. If the observed rotation direction is correct, continue with step 10 below.
7. Make certain power is turned off and locked out.
8. Switch the armature leads connected to C (+) and D (-).

Figure 2.2 Motor Connections



Straight Shunt Machine, CCW Rotation Facing Commutator End

Straight Shunt Machine, CW Rotation Facing Commutator End

9. Apply power to the drive.
10. Repeat steps 4 and 5 above and verify that the motor rotation is correct.

11. Complete the appropriate procedure based on the type of feedback device used for the application:

- ❏ For Armature Voltage feedback - Continue with Step 10 Configure the Speed Feedback Parameters: on page 2-12.
- ❏ For Analog Tachometer feedback - Assert a Jog command and verify that the sign and value of Par 1408 [Tachometer Speed] corresponds with the actual direction of the motor. If the sign and value of Par 1408 [Tachometer Speed] and the motor direction do not correspond, remove power from the drive and reverse the tachometer connections at the drive. Continue with Step 10 Configure the Speed Feedback Parameters: on page 2-12.
- ❏ For Encoder feedback - Assert a Jog command and verify that the sign and value of Par 420 [Encoder Speed] correspond with the actual direction of the motor. If the sign and value of [Par 420 [Encoder Speed] and the motor direction do not correspond, remove power from the drive and reverse the encoder connections at the drive. Reverse the polarity of only one channel, e.g., B and B NOT. Refer to Table 1.V on page 1-36 for digital encoder terminal block designations. Continue with Step 10 Configure the Speed Feedback Parameters: on page 2-12.

10. Configure the Speed Feedback Parameters:

1. Access the “Speed Feedback” group and configure the following parameters:

- ❏ Par 414 [Fdbk Device Type] - Select the source for motor velocity feedback: 1 “Encoder”, 2 “DC Tach” or 3 “Armature” (default). If operating the drive in field weakening mode, Par 414 [Fdbk Device Type] must be set to 1 "Encoder" or 2 "DC Tach".
- ❏ Par 457 [Spd Fdbk Control] - If you are using an encoder or tachometer, set this parameter to 1 “Enabled” to activate speed feedback control.
- ❏ If the speed feedback source is an analog tachometer, set the fine scaling value in Par 562 [Anlg Tach Gain]. This value is used to scale the analog tachometer feedback signal after it has been conditioned by the drive hardware.

ATTENTION: The drive can overspeed if DIP switch S4 is set incorrectly, or the tach is wired incorrectly. Failure to observe this precaution could result in damage to the drive or process equipment. Refer to Figure 1.30 on page 1-30.

- ❏ If the speed feedback source is a digital encoder, enter the pulses per revolution from the encoder nameplate in Par 169 [Encoder PPR].
- ❏ If the speed feedback source is a digital encoder, set Par 652 [Encoder Err Chk] to 1 “Enabled” to activate monitoring of the digital encoder signals (verifies the presence of the A, B, A-, B- signals). Par 457 [Spd Fdbk Control] must be set to 1 “Enabled” for encoder monitoring to occur. Switch S20 must be set correctly to prevent Encoder faults. Refer to Table 1.M on page 1-29.

2. Access the “Speed Command” file and press Enter.

3. With the “Limits” group selected, press Enter and configure the following parameters:

- ❏ Par 1 [Minimum Speed] - Enter the minimum speed reference limit.
- ❏ Par 2 [Maximum Speed] - Enter the maximum speed required by the application (this can be above the motor base speed if field weakening is used).

4. Access the “Dynamic Control” file and press Enter.
5. Access the “Ramp Rates” group and configure the following parameters:
   - ❑ Par 660 [Accel Time 1] - Set the desired acceleration ramp time.
   - ❑ Par 662 [Decel Time 1] - Set the desired deceleration ramp time.

11. Tune the Speed Regulator:

The speed regulator auto tuning test detects the total inertia value of the motor shaft (in Kg-m²), the friction value (in N-m) and the calculation of the proportional (P) and integral (I) gains of the speed regulator.

ATTENTION: This test requires the free rotation of the motor shaft combined with the load. The auto tuning test of the speed loop cannot be carried out on machines with a limited stroke.

Important: The test is carried out by using the torque limit value set in the Par 1048 [Autotune Cur Lim] (recommended value = 20%). The torque reference is applied via a step reference (without a ramp); therefore there must not be any “backlash” in the mechanical transmission and it must be compatible with those operations using the torque limit value set in the Par 1048 [Autotune Cur Lim]. You can modify the torque limit value via this parameter.

Important: In applications where the system total inertia value is very high, it is necessary to increase the value of Par 1048 [Autotune Cur Lim] in order to avoid “Time out” errors. The speed regulator auto tuning test of the speed loop is not suitable for drives used in “elevator” and/or lifting system applications.

1. While still in the “Autotune” group, configure the motor shaft rotation direction via the Par 1029 [Speed Tune Dir]; 1 “Forward” = clockwise or 2 “Reverse” = counter-clockwise.
2. Select the Par 1027 [Spd Reg Autotune], enter “1” and press Enter.

3. Press the Start button on the HIM. This will start the speed regulator auto tuning test, which could take several minutes. When the test has been completed, the drive sill automatically stop.

   During the test the following are completed:

   - ❏ An acceleration test, with the torque limit value set in the Par 1048 [Autotune Cur Lim].
   - ❏ A deceleration test, with a lower torque limit value applied, until zero speed has been reached.
   - ❏ Par 1013 [Torque Const] is calculated and updated based on the entered motor data.

   The test threshold speed is 33% of the lowest value set in the following Pars:

   - ❏ 45 [Max Ref Speed]
   - ❏ 3 [Max Speed Fwd] or 4 [Max Speed Rev] based on the rotation direction chosen in Par 1029 [Speed Tune Dir]

   The drive will determine the speed loop gains (Pars 87 [Spd Reg Kp] and 88 [Spd Reg Ki]) based on the motor and load inertia and friction characteristics.

   If any fault occur during the test, refer to Auto Tuning Faults on page 2-15 for a description and more information.

   Note: If any manual adjustments are required (due to vibrations, etc.), these should be carried out according to the value of the integral gain Par 88 [Spd Reg Ki]. If the speed regulator auto tuning test does not provide satisfactory results, refer to Fine Tuning the Regulators on page C-22.

   The values determined by the Speed Regulator tuning tests are updated in Pars 87 [Spd Reg Kp], 88 [Spd Reg Ki], 1014 [Inertia] and 1015 [Friction] and displayed in the corresponding Pars 1032 [Speed Tune Kp], 1033 [Speed Tune Ki], 1030 [Spd Tune Inertia] and 1031 [SpdTune Friction], respectively. The values of Pars 1030 - 1033 can be used as a record of the Speed Regulator auto tuning results if the values of Pars 87, 88, 1014 and 1015 are subsequently changed.

12. Verify Speed Reference Settings and Drive Operation:

    Verify the following speed and direction (for four quadrant drives) references of the drive under a load.

ATTENTION: This test requires the free rotation of the motor shaft combined with the load. All of the steps in the “Drive Start Up” procedure must have been completed before completing this step.

1. Set the speed reference to “0” (zero) using the assigned source (HIM or analog potentiometer). Refer to Reference Control on page C-10 for more information on speed reference sources.
2. View Par 385 [Speed Ref Out] and verify that the value is “0”.
3. Press the Start button on the HIM and slowly increase the speed reference until full speed is reached (viewed in Par 385 [Speed Ref Out]).
4. If using a four quadrant (regenerative) drive, press the Direction button on the HIM and verify that the motor ramps down to “0” speed and then to full speed in the opposite direction.
5. Press the Stop button on the HIM and verify that the drive ramps to “0” speed and stops.

Auto Tuning Faults

Following is a list of faults that may display during the speed regulator auto tuning test. In some cases, the drive’s control circuits may detect a value(s) that is out of range for the configuration settings during the speed regulator auto tuning test. In these cases, make the suggested adjustments and repeat the test. If the fault occurs again, complete the Fine Tuning the Regulators procedures beginning on page C-22.

Fault	No.	Description	Action
STune Overspeed	56	The measured motor speed is too high during the speed regulator auto tuning procedure.	Decrease the value of Par 1048 [Autotune Cur Lim] and repeat the auto tune procedure.
STune Stalled	57	The drive stalled during the speed regulator auto tuning procedure.	Increase the value of Par 1048 [Autotune Cur Lim] and repeat the auto tune procedure.
STune LoadHi	58	The loading torque value is too high at zero speed to complete the speed regulator auto tuning procedure.	Decrease the load torque, where applicable, and repeat the auto tune procedure.
STune CurLimit	59	The value of Par 1048 [Autotune Cur Lim] for auto tuning the speed regulator is set too high.	Decrease the value of Par 1048 [Autotune Cur Lim] and repeat the auto tune procedure.
STune FrictionLo	60	The friction value attained during the auto tuning procedure is zero or lower than the control precision limit.	Decrease the value of Par 1048 [Autotune Cur Lim] and repeat the auto tune procedure.
STune Timeout	61	The speed regulator auto tuning procedure did not complete within the available time.	Verify the value in Par 1048 [Autotune Cur Lim]. If this value is set to low, the motor will not be able to reach a maximum speed of 33% of the lower of the values in Par 45 [Max Ref Speed] or Par 3 [Max Speed Fwd] or Par 4 [Max Speed Rev] and not be able to complete the test. Set these values appropriately and repeat the auto tuning procedure.
STune Aborted	62	The speed regulator auto tuning procedure has been stopped by the user.	Informational only.

For additional regulator fine tuning procedures, refer to Fine Tuning the Regulators on page C-22.

Speed-Up Function

Oscillation may occur during a speed change with loads presenting a high moment of inertia. These oscillations can be reduced by enabling the “Speed Up” function. Refer to Speed Up Function on page C-17 for more information.

Configuring the Speed Zero Logic

The speed zero logic is factory set to 0 “Disabled”. Refer to Speed Zero Function on page C-19 for more information.

Adaptive Speed Regulation

The adaptive function of the speed regulator is factory set to 0 “Disabled”. It should only be used when the gain of the speed regulator must go higher than the speed range. For instructions on configuring these parameters refer to Adaptive Speed Regulator on page C-14.

Programming and Parameters

This chapter provides a complete listing and description of the PowerFlex DC drive parameters. The parameters can be programmed (viewed/edited) using a Human Interface Module (HIM). As an alternative, programming can also be performed using DriveExplorer™ or DriveTools™ SP software[1] and a personal computer. Refer to Appendix B for a brief description of the LCD HIM. Refer to Appendix D for drive control block diagrams.

For information on . . .	See page . . .
About Parameters	3-1
How Parameters are Organized	3-3
Monitor File	3-11
Motor Control File	3-14
Speed Command File	3-23
Dynamic Control File	3-28
Applications File	3-33
Utility File	3-45
Communications File	3-57
Input / Output File	3-61
Parameter Cross Reference – by Name	3-71
Parameter Cross Reference – by Number	3-76

About Parameters

To configure a drive to operate in a specific way, certain parameters may need to be changed from the default value. Three types of parameters exist:

- **ENUM Parameters**
  ENUM parameters allow a selection from two or more items. The LCD HIM will display a text message for each item.
- **Bit Parameters**
  Bit parameters have individual bits associated with features or conditions. If the bit is “0”, the feature is off or the condition is false. If the bit is “1”, the feature is on or the condition is true.
- **Numeric Parameters**
  These parameters have a single numerical value and unit (i.e. 0.1 Volts).

The example on the following page shows how each parameter type is presented in this manual.

[1] You must use DriveExplorer v5.02 or higher or DriveTools SP v4.01 or higher with a PowerFlex DC drive specific software patch. The patch can be downloaded from http://www.ab.com/support/abdrives/webupdate/

❶ File	❷ Group	❸ No.	❹ Parameter Name & Description	❺ Values			❻ Related
SPEED COMMAND	Speed Regulator	388	**[Flying Start En]** Enables/Disables the ability of the drive to connect to a spinning motor at actual RPM when a start command is issued. • "Enabled" = When the drive is turned on, the speed of the motor is measured and the ramp output is set accordingly. The drive then runs at the set reference value. • "Disabled" = When the drive is turned on, the ramp starts from zero. Main uses: • To connect to a motor that is already spinning due to its load (e.g. in the case of pumps, the flowing medium). • Re–connection to a spinning motor after a fault or alarm. Note: If the Flying Start function is disabled, ensure that the motor is not spinning when the drive is turned on, or harsh motor deceleration in current limit may occur.	Default: Options:	0 = 0 = 1 =	"Disabled" "Disabled" "Enabled"	
		445	**[Spd Up Gain Pct]** The Speed Up function gain as a percentage of Par 446 [Speed Up Base].	Default: Min/Max: Units:	0.00 0.00 / 100.00 %		ℹ
COMMUNICATIONS	Masks & Owners	591	**[Logic Mask]** Determines which ports can control the drive when Par 1377 [Write Mask Act], bit 15 is set to "1." If the bit for a port is set to "0," the port will have no control functions except for stop. 0 = Control Masked, 1 = Control Permitted, x = Reserved.				1377

	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	DPI Port 5	DPI Port 4	DPI Port 3	DPI Port 2	DPI Port 1	Digital In
Default	x	x	x	x	x	x	x	x	x	x	0	0	0	0	1	1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

No.	Description		
❶	**File** – Lists the major parameter file category.		
❷	**Group** – Lists the parameter group within a file.		
❸	**No.** – Parameter number. = The parameter value cannot be changed until the drive is stopped.		
❹	**Parameter Name & Description** – Parameter name as it appears on an LCD HIM, with a brief description of the parameters function.		
❺	**Values** – Defines the various operating characteristics of the parameter. Three types exist.		
	ENUM	Default:	Lists the value assigned at the factory. "Read Only" = no default.
		Options:	Displays the programming selections available.
	Bit	Bit:	Lists the bit place holder and definition for each bit.
	Numeric	Default:	Lists the value assigned at the factory. "Read Only" = no default.
		Min/Max: Units:	The range (lowest and highest setting) possible for the parameter. Unit of measure and resolution as shown on the LCD HIM.
		Important: Some parameters will have two unit values: • E.g.: Analog inputs can be set for current or voltage as with Par 71 [Anlg Inx Config].	
		Important: When sending values through DPI ports, simply remove the decimal point to arrive at the correct value (i.e. to send "5.00 RPM", use "500").	
❻	**Related** – Lists parameters (if any) that interact with the selected parameter. The symbol "ℹ" indicates that additional parameter information is available in Appendix C - Application Notes on page C-1.		

How Parameters are Organized

The LCD HIM displays parameters in a **File–Group–Parameter** or **Numbered List** view order. To switch display mode, access the Main Menu, press ALT, then Sel (View) while the cursor is on the Parameter menu selection. In addition, using Par 211 [Param Access Lvl], you have the option to display the most commonly used parameters (Basic Parameter view) or *all* parameters (Advanced Parameter View).

File–Group–Parameter Order

This simplifies programming by grouping parameters that are used for similar functions. The parameters are organized into files. Each file is divided into groups, and each parameter is an element in a group. By default, the LCD HIM displays parameters by File–Group–Parameter view.

Numbered List View

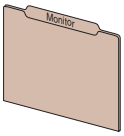
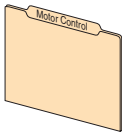
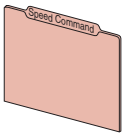
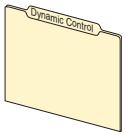
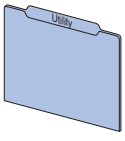
All parameters are in numerical order.

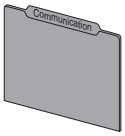
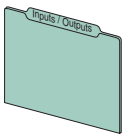
Cross Reference Tables

Refer to Parameter Cross Reference – by Name on page 3-71 and Parameter Cross Reference – by Number on page 3-76 for a list of parameters and page numbers.

Basic Parameter View

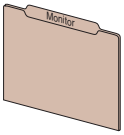
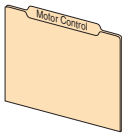
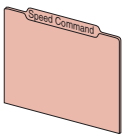
Parameter 211 [Param Access Lvl] set to option 0 “Basic”.

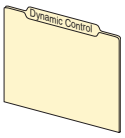
File	Group	Parameters					
Monitor 	Speed Meters	[Speed Ref A] [Speed Ref A Pct] [Speed Ref B] [Speed Ref B Pct] [Speed Ref Out] [Spd Ref Out Pct] [Ramp In]	44 47 48 49 385 384 110	[Ramp In Pct] [Ramp Out] [Ramp Out Pct] [Speed Draw Out] [Spd Draw Out Pct] [Speed Reg In] [Speed Reg In Pct]	111 113 114 1018 1019 118 117	[Spd Feedback] [Spd Feedback Pct] [Actual Speed] [Encoder Speed] [Tachometer Speed]	122 121 924 420 1408
	Current Meters	[Spd Reg Out Pct] [Current Reg In] [Arm Current] [Arm Current Pct]	236 41 200 199	[Field Current] [Fld Current Pct] [Cur Lim Pos Out] [Cur Lim Neg Out]	351 234 10 11	[Filt TorqCur Pct] [Field Ref Pct]	928 500
	Drive Data	[FaultCode] [AC Line Voltage] [AC Line Freq]	57 466 588	[Output Voltage] [Output Power] [Drive Type]	233 1052 300	[Drive Size] [Elapsed Lifetime] [Software Version]	465 235 331
Motor Control 	Motor Data	[Max Ref Speed] [Max Feedback Spd]	45 162	[Rated Motor Volt] [Nom Mtr Arm Amps]	175 179	[Nom Mtr Fld Amps] [Drv Fld Brdg Cur]	280 374
	Field Config	[Field Reg Enable] [Field Economy En] [Field Econ Delay]	497 499 1407	[Field Mode Sel] [Max Fld Curr Pct] [Min Fld Curr Pct]	469 467 468	[Fld Weaken Ratio]	456
	Torq Attributes	[Current Limit] [Current Lim Pos] [Current Lim Neg]	7 8 9	[Torque Ref] [Trim Torque] [Torque Reduction]	39 40 342	[Zero Torque]	353
	Speed Feedback	[Fdbk Device Type] [Anlg Tach Gain]	414 562	[Anlg Tach Zero] [Spd Fdbk Control]	563 457	[SpdReg FB Bypass]	458
	Autotune	[Autotune Cur Lim] [CurrReg Autotune] [Arm Resistance] [Arm Inductance]	1048 452 453 454	[Spd Reg Autotune] [Speed Tune Dir] [Speed Tune Kp] [Speed Tune Ki]	1027 1029 1032 1033	[Spd Tune Inertia] [SpdTune Friction]	1030 1031
Speed Command 	Limits	[Minimum Speed] [Min Speed Fwd]	1 5	[Min Speed Rev] [Maximum Speed]	6 2	[Max Speed Fwd] [Max Speed Rev]	3 4
	Discrete Speeds	[Jog Speed] [Preset Speed 1] [Preset Speed 2]	266 154 155	[Preset Speed 3] [Preset Speed 4] [Preset Speed 5]	156 157 158	[Preset Speed 6] [Preset Speed 7] [TB Manual Ref]	159 160 267
	Speed References	[Trim Ramp] [Trim Ramp Pct]	42 378	[Trim Speed] [Trim Speed Pct]	43 379	[Speed Ratio]	1017
	Speed Regulator	[Speed Reg En] [Arm Volt Kp]	242 493	[Spd Reg Kp] [Arm Volt Ki]	87 494	[Spd Reg Ki]	88
Dynamic Control 	Ramp Rates	[Speed Ramp En] [Ramp Type Select] [Accel Time 1]	245 18 660	[Decel Time 1] [Accel Time 2] [Decel Time 2]	662 24 32	[MOP Accel Time] [MOP Decel Time] [S Curve Time]	22 30 19
	Restart Modes	[Start At Powerup]	1344	[Powerup Delay]	1345		
Utility 	Reference Config	[Direction Mode] [Save HIM Ref]	1322 209	[Man Ref Preload] [Save MOP Ref]	210 249	[MOP Select]	1375
	Drive Memory	[Param Access Lvl]	211	[Reset Defaults]	258		
	Diagnostics	[Drive Status 1] [Drive Status 2] [Last Stop Source]	381 382 1402	[Start Inhibits] [Drive Logic Rslt] [At Speed]	1403 1328 394	[At Zero Speed] [CurrLimit Active] [Spd Limit Active]	395 349 372
	Faults	[Clear Fault Que] [Fault Clear] [Fault Clr Mode] [Status1 at Fault]	263 1347 1348 1349	[Status2 at Fault] [Fault Arm Amps] [Fault Speed] [Fault Field Amps]	1350 1371 1372 1373	[Fault Voltage] [Fault 1 Code]	1374 1351
	Alarms	[Drive Alarm 1]	1380				

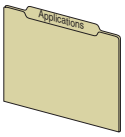
File	Group	Parameters					
Communications 	Comm Control	[DPI Baud Rate]	589	[DPI Fdbk Select]	1321	[DPI Port Value]	1343
		[DPI Port Sel]	590				
	Masks & Owners	[Logic Mask]	591	[MOP Mask]	598	[Reference Owner]	604
		[Start Mask]	592	[Local Mask]	599	[Accel Owner]	605
		[Jog Mask]	593	[Decel Mask]	631	[Fault Clr Owner]	606
		[Direction Mask]	594	[Stop Owner]	600	[MOP Owner]	607
		[Reference Mask]	595	[Start Owner]	601	[Local Owner]	608
		[Accel Mask]	596	[Jog Owner]	602	[Decel Owner]	609
		[Fault Clr Mask]	597	[Direction Owner]	603		
	Datalinks	[Data In A1]	610	[Data In D1]	616	[Data Out C1]	622
		[Data In A2]	611	[Data In D2]	617	[Data Out C1]	623
		[Data In B1]	612	[Data Out A1]	618	[Data Out D1]	624
		[Data In B2]	613	[Data Out A2]	619	[Data Out D2]	625
		[Data In C1]	614	[Data Out B1]	620	[Data In Val Sel]	1319
		[Data In C2]	615	[Data Out B2]	621	[Data In SelData]	1320
Input / Output 	Analog Inputs	[Anlg In1 Sel]	70	[Anlg In1 Target]	295	[Anlg In1 Cmp Eq]	1045
		[Anlg In1 Config]	71	[Anlg In2 Target]	296	[Analog In1 Value]	1404
		[Anlg In2 Sel]	75	[Anlg In3 Target]	297	[Analog In2 Value]	1405
		[Anlg In2 Config]	76	[Anlg In1 Cmp]	1042	[Analog In3 Value]	1406
		[Anlg In3 Sel]	80	[Anlg In1 Cmp Err]	1043		
		[Anlg In3 Config]	81	[Anlg In1 Cmp Dly]	1044		
	Analog Outputs	[Anlg Out1 Sel]	66	[Anlg Out4 Sel]	69	[Analog Out3 Scale]	64
		[Anlg Out2 Sel]	67	[Analog Out1 Scale]	62	[Analog Out4 Scale]	65
		[Anlg Out3 Sel]	68	[Analog Out2 Scale]	63		
	Digital Inputs	[Dig In Status]	564	[Digital In9 Sel]	141	[Dig In Term 6]	570
		[Digital In1 Sel]	133	[Digital In10 Sel]	142	[Dig In Term 7]	571
		[Digital In2 Sel]	134	[Digital In11 Sel]	143	[Dig In Term 8]	572
		[Digital In3 Sel]	135	[Digital In12 Sel]	144	[Dig In Term 9]	573
		[Digital In4 Sel]	136	[Dig In Term 1]	565	[Dig In Term 10]	574
		[Digital In5 Sel]	137	[Dig In Term 2]	566	[Dig In Term 11]	575
		[Digital In6 Sel]	138	[Dig In Term 3]	567	[Dig In Term 12]	576
		[Digital In7 Sel]	139	[Dig In Term 4]	568		
		[Digital In8 Sel]	140	[Dig In Term 5]	569		
	Digital Outputs	[Dig Out Status]	581	[Digital Out4 Sel]	148	[Digital Out8 Sel]	152
		[Digital Out1 Sel]	145	[Digital Out5 Sel]	149	[Relay Out 1 Sel]	1392
		[Digital Out2 Sel]	146	[Digital Out6 Sel]	150	[Relay Out 2 Sel]	629
		[Digital Out3 Sel]	147	[Digital Out7 Sel]	151		
	DPI Inputs	[DPI P1 Select]	1323	[DPI P3 Select]	1325	[DPI P5 Select]	1327
		[DPI P2 Select]	1324	[DPI P4 Select]	1326		

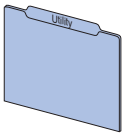
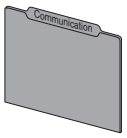
Advanced Parameter View

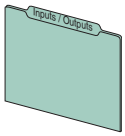
Parameter 211 [Param Access Lvl] set to option 1 “Advanced”.

File	Group	Parameters					
Monitor 	Speed Meters	[Speed Ref A]	44	[Ramp In Pct]	111	[Spd Feedback]	122
		[Speed Ref A Pct]	47	[Ramp Out]	113	[Spd Feedback Pct]	121
		[Speed Ref B]	48	[Ramp Out Pct]	114	[Actual Speed]	924
		[Speed Ref B Pct]	49	[Speed Draw Out]	1018	[Encoder Speed]	420
		[Speed Ref Out]	385	[Spd Draw Out Pct]	1019	[Tachometer Speed]	1408
		[Spd Ref Out Pct]	384	[Speed Reg In]	118		
		[Ramp In]	110	[Speed Reg In Pct]	117		
	Current Meters	[Spd Reg Out Pct]	236	[Field Current]	351	[Filt TorqCur Pct]	928
		[Current Reg In]	41	[Fld Current Pct]	234	[Field Ref Pct]	500
		[Arm Current]	200	[Cur Lim Pos Out]	10		
		[Arm Current Pct]	199	[Cur Lim Neg Out]	11		
	Drive Data	[FaultCode]	57	[Output Voltage]	233	[Drive Size]	465
		[AC Line Voltage]	466	[Output Power]	1052	[Elapsed Lifetime]	235
		[AC Line Freq]	588	[Drive Type]	300	[Software Version]	331
Motor Control 	Motor Data	[Max Ref Speed]	45	[Nom Mtr Arm Amps]	179	[Drive Type Sel]	201
		[Max Feedback Spd]	162	[Nom Mtr Fld Amps]	280		
		[Rated Motor Volt]	175	[Drv Fld Brdg Cur]	374		
	Field Config	[Field Reg Enable]	497	[Fld Weaken Ratio]	456	[Fld Reg Ki Base]	98
		[Field Economy En]	499	[Fld Reg Kp]	91	[Set Fld Curve]	919
		[Field Econ Delay]	1407	[Fld Reg Ki]	92	[Reset Fld Curve]	920
		[Field Mode Sel]	469	[Force Min Field]	498	[Fld Const 40 Pct]	916
		[Max Fld Curr Pct]	467	[Out Volt Level]	921	[Fld Const 70 Pct]	917
		[Min Fld Curr Pct]	468	[Fld Reg Kp Base]	97	[Fld Const 90 Pct]	918
	Torq Attributes	[Current Limit]	7	[Torque Reduction]	342	[TrqTpr_Lim2]	753
		[Current Lim Pos]	8	[Zero Torque]	353	[TrqTpr_Lim3]	754
		[Current Lim Neg]	9	[TrqTpr_Enable]	750	[TrqTpr_Lim4]	755
		[Torque Ref]	39	[TrqTpr_Lim0]	751	[TrqTpr_Spd]	756
		[Trim Torque]	40	[TrqTpr_Lim1]	752	[Filt Torq Cur]	926
	Speed Feedback	[Fdbk Device Type]	414	[Spd Fdbk Error]	455	[Z Channel Enable]	911
		[Anlg Tach Gain]	562	[Act Spd Filter]	923	[Z Capture Pos En]	912
		[Anlg Tach Zero]	563	[Encoder PPR]	169	[Z Captured Pos]	913
		[Spd Fdbk Control]	457	[Encoder Out Sel]	1021		
		[SpdReg FB Bypass]	458	[Encoder Err Chk]	652		
	Autotune	[Autotune Cur Lim]	1048	[Speed Tune Dir]	1029	[I Reg Error]	587
		[CurrReg Autotune]	452	[Speed Tune Kp]	1032	[Inertia C Filter]	1012
		[Arm Resistance]	453	[Speed Tune Ki]	1033	[Torque Const]	1013
		[Arm Inductance]	454	[Spd Tune Inertia]	1030	[Inertia]	1014
		[Spd Reg Autotune]	1027	[SpdTune Friction]	1031	[Friction]	1015
	Test Generator	[TstGen Output]	58	[TstGen Amplitude]	60	[TstGen Offset]	61
		[TstGen Frequency]	59				
Speed Command 	Limits	[Minimum Speed]	1	[Min Speed Rev]	6	[Max Speed Fwd]	3
		[Min Speed Fwd]	5	[Maximum Speed]	2	[Max Speed Rev]	4
	Discrete Speeds	[Jog Speed]	266	[Preset Speed 3]	156	[Preset Speed 6]	159
		[Preset Speed 1]	154	[Preset Speed 4]	157	[Preset Speed 7]	160
		[Preset Speed 2]	155	[Preset Speed 5]	158	[TB Manual Ref]	267
	Speed References	[Trim Ramp]	42	[Trim Speed]	43	[Speed Ratio]	1017
		[Trim Ramp Pct]	378	[Trim Speed Pct]	379		
	Speed Regulator	[Speed Reg En]	242	[Speed Thresh Neg]	102	[Flying Start En]	388
		[Arm Volt Kp]	493	[Threshold Delay]	103	[Spd Fdbk Filter]	444
		[Arm Volt Ki]	494	[At Speed Error]	104	[Spd Up Gain Pct]	445
		[Spd Reg Kp]	87	[At Speed Delay]	105	[Speed Up Base]	446
		[Spd Reg Ki]	88	[Ref Zero Level]	106	[Speed Up Filter]	447
		[Arm Volt Kp Base]	495	[Speed Zero Level]	107	[SpdReg Kp Bypass]	459
		[Arm Volt Ki Base]	496	[Speed Zero Delay]	108	[SpdReg Ki Bypass]	460
		[Spd Reg Kp Base]	93	[Spd Zero I En]	123	[SpdFuncSelect]	1016
		[Spd Reg Ki Base]	94	[Spd Ref Zero En]	124	[InertiaCompAct]	1191
		[Spd Reg Kp Outpt]	99	[Spd Zero P En]	125	[InertiaCompVar]	1192
		[Spd Reg Ki Outpt]	100	[Spd Zero P Gain]	126		
		[Speed Thresh Pos]	101	[Lock Speed Integ]	348		

File	Group	Parameters					
Dynamic Control 	Ramp Rates	[Speed Ramp En]	245	[MOP Accel Time]	22	[S Curve Decel 2]	668
		[Ramp Type Select]	18	[MOP Decel Time]	30	[Ramp Delay]	20
		[Accel Time 1]	660	[S Curve Time]	19	[Zero Ramp Output]	344
		[Decel Time 1]	662	[S Curve Accel 1]	665	[Zero Ramp Input]	345
		[Accel Time 2]	24	[S Curve Decel 1]	666	[Freeze Ramp]	373
		[Decel Time 2]	32	[S Curve Accel 2]	667	[Acc Dec Filter]	1212
	Load Limits	[Enable Droop	699	[Droop Limit]	700	[Torq Limit Type]	715
		[Droop Percent]	696	[Load Comp]	698		
		[Droop Filter]	697	[Torq Red CurLim]	13		
	Stop Modes	[Fast Stop Time]	38	[Closing Speed]	1262	[Ramp In Zero En]	1265
		[Spd 0 Trip Delay]	627	[Opening Delay]	1263	[Actuator Delay]	1266
	Restart Modes	[Start At Powerup]	1344	[Powerup Delay]	1345		
	Adaptv Regulator	[Adaptive Spd En]	181	[Adaptive Joint 1]	186	[Adaptive I Gain2]	191
		[Adaptive Reg Typ]	182	[Adaptive Joint 2]	187	[Adaptive P Gain3]	192
		[Adaptive Ref]	183	[Adaptive P Gain1]	188	[Adaptive I Gain3]	193
		[Adaptive Spd 1]	184	[Adaptive I Gain1]	189		
		[Adaptive Spd 2]	185	[Adaptive P Gain2]	190		

File	Group	Parameters					
Applications 	PI Control	[Enable PI]	769	[PI Central v1]	776	[PI Central vs1]	781
		[PI Steady Thrsh]	695	[PI Central v2]	777	[PI integr freeze]	783
		[PI Integral Gain]	764	[PI Central v3]	778	[PI Upper Limit]	784
		[PI Prop Gain PID]	765	[PI Central v sel]	779	[PI Lower Limit]	785
		[PI Output]	771	[PI Central vs0]	780	[PI Init Prop Gn]	793
	PD Control	[Enable PD]	770	[PD Deriv Filter]	767	[PD Deriv Gain 2]	789
		[PD Output PID]	421	[PD Prop Gain 1]	768	[PD Prop Gain 3]	790
		[PD Deriv Gain 1]	766	[PD Prop Gain 2]	788	[PD Deriv Gain 3]	791
	PID Control	[Enable PID]	1258	[PID Setpoint 0]	760	[PID Target]	782
		[Real FF PID]	418	[PID Setpoint 1]	761	[PID Source]	786
		[PID Steady Delay]	731	[PID Setpoint Sel]	762	[PID Source Gain]	787
		[PI Init Intgl Gn]	734	[PID Feedback]	763	[PID Accel Time]	1046
		[PID Clamp]	757	[PID Output Sign]	772	[PID Decel Time]	1047
		[Feed Fwd PID]	758	[PID Output Scale]	773	[PID Error Gain]	1254
		[PID Error]	759	[PID Output]	774		
	Scale Blocks	[Scale1 Input]	484	[Scale3 Input]	1218	[Scale5 Input]	1236
		[Scale1 Output]	485	[Scale3 Output]	1219	[Scale5 Output]	1237
		[Scale1 Mul]	486	[Scale3 Mul]	1220	[Scale5 Mul]	1238
		[Scale1 Div]	487	[Scale3 Div]	1221	[Scale5 Div]	1239
		[Scale1 In Max]	488	[Scale3 In Max]	1222	[Scale5 In Max]	1240
		[Scale1 In Min]	489	[Scale3 In Min]	1223	[Scale5 In Min]	1241
		[Scale1 In Off]	490	[Scale3 In Off]	1224	[Scale5 In Off]	1242
		[Scale1 Out Off]	491	[Scale3 Out Off]	1225	[Scale5 Out Off]	1243
		[Scale1 In Abs]	492	[Scale3 In Abs]	1226	[Scale5 In Abs]	1244
		[Scale2 Input]	553	[Scale4 Input]	1227	[Scale6 Input]	1245
		[Scale2 Output]	554	[Scale4 Output]	1228	[Scale6 Output]	1246
		[Scale2 Mul]	555	[Scale4 Mul]	1229	[Scale6 Mul]	1247
		[Scale2 Div]	556	[Scale4 Div]	1230	[Scale6 Div]	1248
		[Scale2 In Max]	557	[Scale4 In Max]	1231	[Scale6 In Max]	1249
		[Scale2 In Min]	558	[Scale4 In Min]	1232	[Scale6 In Min]	1250
		[Scale2 In Off]	559	[Scale4 In Off]	1233	[Scale6 In Off]	1251
		[Scale2 Out Off]	560	[Scale4 Out Off]	1234	[Scale6 Out Off]	1252
		[Scale2 In Abs]	561	[Scale4 In Abs]	1235	[Scale6 In Abs]	1253
	Diameter Calc	[Diameter Calc]	794	[Line Spd Thresh]	1155	[Diam Preset 0]	1164
		[DncrPosSpd]	795	[Line Spd Gain]	1156	[Diam Preset 1]	1165
		[Max Deviation]	796	[Diameter Reset]	1157	[Diam Preset 2]	1166
		[Gear Box Ratio]	797	[Diam Threshold]	1158	[Diam Preset 3]	1167
		[Dancer Constant]	798	[Diameter Reached]	1159	[Diam Preset Sel]	1168
		[Minimum Diameter]	799	[Line Speed Pct]	1160	[Diam Inc Dec En]	1205
		[Diameter Calc St]	800	[Diam Calc Dis]	1161	[Diam init filter	1206
		[Max Diameter]	1153	[Diameter Filter]	1162	[Diam stdy delay]	1207
		[Roll Diameter]	1154	[Base Omega]	1163		
	Winder Functions	[Variable J Comp]	1171	[Line FastStp Pct]	1186	[Torque Winder En]	1209
		[Constant J Comp]	1172	[Winder Type]	1187	[W Target]	1210
		[Materl Width Pct]	1173	[Torq Current Pct]	1193	[Actual Comp]	1213
		[Static Friction]	1174	[Act Ten Ref Pct]	1194	[Closed Loop En]	1214
		[Dynamic Friction]	1175	[Speed Match]	1195	[Speed Demand En]	1215
		[Taper Enable]	1176	[Spd Match Acc]	1196	[Spd match torque]	1216
		[Initial Diameter]	1177	[Spd Match Dec]	1197	[W Reference]	1217
		[Final Diameter]	1178	[Offs Accel Time]	1198	[Jog TW Speed]	1255
		[Tension Reduct]	1179	[W Offset]	1199	[Jog TW Enable]	1256
		[Tension Ref]	1180	[Spd Match Gain]	1200	[Ref Spd Source]	1284
		[Tension Scale]	1181	[Winder Side]	1201	[Ref Speed Gain]	1285
		[Time AccDec Min]	1182	[W Gain]	1202	[Ref Line Speed]	1286
		[Int Acc Calc En]	1183	[Spd Match Compl]	1203	[Static F Zero]	1287
		[Line Accel Pct]	1184	[Line Spd Source]	1204		
		[Line Decel Pct]	1185	[Close Loop Comp]	1208		

File	Group	Parameters					
Utility 	Reference Config	[Direction Mode]	1322	[Man Ref Preload]	210	[MOP Select]	1375
		[Save HIM Ref]	209	[Save MOP Ref]	249		
	Drive Memory	[Param Access Lvl]	211	[Reset Defaults]	258		
	Diagnostics	[Drive Status 1]	381	[Torque Positive]	346	[Accel Status]	1188
		[Drive Status 2]	382	[Torque Negative]	347	[Decel Status]	1189
		[Last Stop Source]	1402	[MOP Inc Active]	396	[Fast Stop Status]	1190
		[Start Inhibits]	1403	[MOP Dec Active]	397	[TestPoint Sel]	1381
		[Drive Logic Rslt]	1328	[Spd Select 0]	400	[TestPoint Data]	1382
		[At Speed]	394	[Spd Select 1]	401	[TaskLoad 32 ms]	1383
		[At Zero Speed]	395	[Spd Select 2]	402	[TaskLoad 1 ms]	1384
		[CurrLimit Active]	349	[Ramp Select 0]	403	[TaskLoad 2 ms]	1385
		[Spd Limit Active]	372	[Ramp Select 1]	404	[TaskLoad 8 ms]	1386
		[Speed Threshold]	393	[Encoder State]	651		
	Faults	[Clear Fault Que]	263	[Fault 2 Code]	1352	[Fault 2 Time]	1362
		[Fault Clear]	1347	[Fault 3 Code]	1353	[Fault 3 Time]	1363
		[Fault Clr Mode]	1348	[Fault 4 Code]	1354	[Fault 4 Time]	1364
		[Status1 at Fault]	1349	[Fault 5 Code]	1355	[Fault 5 Time]	1365
		[Status2 at Fault]	1350	[Fault 6 Code]	1356	[Fault 6 Time]	1366
		[Fault Arm Amps]	1371	[Fault 7 Code]	1357	[Fault 7 Time]	1367
		[Fault Speed]	1372	[Fault 8 Code]	1358	[Fault 8 Time]	1368
		[Fault Field Amps]	1373	[Fault 9 Code]	1359	[Fault 9 Time]	1369
		[Fault Voltage]	1374	[Fault 10 Code]	1360	[Fault 10 Time]	1370
		[Fault 1 Code]	1351	[Fault 1 Time]	1361		
	Alarms	[Drive Alarm 1]	1380	[OverTemp Flt Cfg]	365	[UnderVolt Thresh]	481
		[OverVolt Flt Cfg]	203	[FldLoss Flt Cfg]	473	[OverCurrent Thr]	584
		[Aux Inp Flt Cfg]	354	[Spd Loss Flt Cfg]	478		
	User Defined	[UsrDsplyMult0]	50	[UserDefined14]	517	[UsrDefBitWrdA15]	535
		[UsrDsplyDiv0]	51	[UserDefined15]	518	[UsrDefBitWrdB]	536
		[UsrValMult1]	53	[UsrDefBitWrdA]	519	[UsrDefBitWrdB0]	537
		[UsrValDiv1]	54	[UsrDefBitWrdA0]	520	[UsrDefBitWrdB1]	538
		[UserDefined0]	503	[UsrDefBitWrdA1]	521	[UsrDefBitWrdB2]	539
		[UserDefined1]	504	[UsrDefBitWrdA2]	522	[UsrDefBitWrdB3]	540
		[UserDefined2]	505	[UsrDefBitWrdA3]	523	[UsrDefBitWrdB4]	541
		[UserDefined3]	506	[UsrDefBitWrdA4]	524	[UsrDefBitWrdB5]	542
		[UserDefined4]	507	[UsrDefBitWrdA5]	525	[UsrDefBitWrdB6]	543
		[UserDefined5]	508	[UsrDefBitWrdA6]	526	[UsrDefBitWrdB7]	544
		[UserDefined6]	509	[UsrDefBitWrdA7]	527	[UsrDefBitWrdB8]	545
		[UserDefined7]	510	[UsrDefBitWrdA8]	528	[UsrDefBitWrdB9]	546
		[UserDefined8]	511	[UsrDefBitWrdA9]	529	[UsrDefBitWrdB10]	547
		[UserDefined9]	512	[UsrDefBitWrdA10]	530	[UsrDefBitWrdB11]	548
		[UserDefined10]	513	[UsrDefBitWrdA11]	531	[UsrDefBitWrdB12]	549
		[UserDefined11]	514	[UsrDefBitWrdA12]	532	[UsrDefBitWrdB13]	550
		[UserDefined12]	515	[UsrDefBitWrdA13]	533	[UsrDefBitWrdB14]	551
		[UserDefined13]	516	[UsrDefBitWrdA14]	534	[UsrDefBitWrdB15]	552
Communications 	Comm Control	[DPI Baud Rate]	589	[DPI Fdbk Select]	1321	[DPI Port Value]	1343
		[DPI Port Sel]	590				
	Masks & Owners	[Logic Mask]	591	[MOP Mask]	598	[Reference Owner]	604
		[Start Mask]	592	[Local Mask]	599	[Accel Owner]	605
		[Jog Mask]	593	[Decel Mask]	631	[Fault Clr Owner]	606
		[Direction Mask]	594	[Stop Owner]	600	[MOP Owner]	607
		[Reference Mask]	595	[Start Owner]	601	[Local Owner]	608
		[Accel Mask]	596	[Jog Owner]	602	[Decel Owner]	609
		[Fault Clr Mask]	597	[Direction Owner]	603		
	Datalinks	[Data In A1]	610	[Data In D1]	616	[Data Out C1]	622
		[Data In A2]	611	[Data In D2]	617	[Data Out C1]	623
		[Data In B1]	612	[Data Out A1]	618	[Data Out D1]	624
		[Data In B2]	613	[Data Out A2]	619	[Data Out D2]	625
		[Data In C1]	614	[Data Out B1]	620	[Data In Val Sel]	1319
		[Data In C2]	615	[Data Out B2]	621	[Data In SelData]	1320
	Security	[Logic Mask]	591	[Write Mask Act]	1377	[Port Mask Act]	1379
		[Logic Mask Act]	1376	[Write Mask Cfg]	1378		

File	Group	Parameters					
Input / Output 	Analog Inputs	[Anlg In1 Sel]	70	[Anlg2 Tune Scale]	78	[Anlg In2 Target]	296
		[Anlg In1 Config]	71	[Anlg In2 Offset]	79	[Anlg In3 Target]	297
		[Anlg In1 Scale]	72	[Anlg In2 Tune]	260	[Anlg In1 Cmp]	1042
		[Anlg1 Tune Scale]	73	[Anlg In3 Sel]	80	[Anlg In1 Cmp Err]	1043
		[Anlg In1 Offset]	74	[Anlg In3 Config]	81	[Anlg In1 Cmp Dly]	1044
		[Anlg In1 Tune]	259	[Anlg In3 Scale]	82	[Anlg In1 Cmp Eq]	1045
		[Anlg In1 Filter]	792	[Anlg3 Tune Scale]	83	[Analog In1 Value]	1404
		[Anlg In2 Sel]	75	[Anlg In3 Offset]	84	[Analog In2 Value]	1405
		[Anlg In2 Config]	76	[Anlg In3 Tune]	261	[Analog In3 Value]	1406
		[Anlg In2 Scale]	77	[Anlg In1 Target]	295		
	Analog Outputs	[Anlg Out1 Sel]	66	[Anlg Out4 Sel]	69	[Analog Out3 Scale]	64
		[Anlg Out2 Sel]	67	[Analog Out1 Scale]	62	[Analog Out4 Scale]	65
		[Anlg Out3 Sel]	68	[Analog Out2 Scale]	63		
	Digital Inputs	[ContactorControl]	1391	[Digital In12 Sel]	144	[Dig In Term 1]	565
		[Dig In Status]	564	[Inversion In 1]	1276	[Dig In Term 2]	566
		[Digital In1 Sel]	133	[Inversion In 2]	1277	[Dig In Term 3]	567
		[Digital In2 Sel]	134	[Inversion In 3]	1278	[Dig In Term 4]	568
		[Digital In3 Sel]	135	[Inversion In 4]	1279	[Dig In Term 5]	569
		[Digital In4 Sel]	136	[Inversion In 5]	1280	[Dig In Term 6]	570
		[Digital In5 Sel]	137	[Inversion In 6]	1281	[Dig In Term 7]	571
		[Digital In6 Sel]	138	[Inversion In 7]	1282	[Dig In Term 8]	572
		[Digital In7 Sel]	139	[Inversion In 8]	1283	[Dig In Term 9]	573
		[Digital In8 Sel]	140	[Inversion In 9]	1387	[Dig In Term 10]	574
		[Digital In9 Sel]	141	[Inversion In 10]	1388	[Dig In Term 11]	575
		[Digital In10 Sel]	142	[Inversion In 11]	1389	[Dig In Term 12]	576
		[Digital In11 Sel]	143	[Inversion In 12]	1390		
	Digital Outputs	[Dig Out Status]	581	[Digital Out7 Sel]	151	[Inversion Out 4]	1270
		[Digital Out1 Sel]	145	[Digital Out8 Sel]	152	[Inversion Out 5]	1271
		[Digital Out2 Sel]	146	[Relay Out 1 Sel]	1392	[Inversion Out 6]	1272
		[Digital Out3 Sel]	147	[Relay Out 2 Sel]	629	[Inversion Out 7]	1273
		[Digital Out4 Sel]	148	[Inversion Out 1]	1267	[Inversion Out 8]	1274
		[Digital Out5 Sel]	149	[Inversion Out 2]	1268	[Inversion Relay1]	1393
		[Digital Out6 Sel]	150	[Inversion Out 3]	1269	[Inversion Relay2]	1275
	DPI Inputs	[DPI P1 Select]	1323	[DPI P3 Select]	1325	[DPI P5 Select]	1327
		[DPI P2 Select]	1324	[DPI P4 Select]	1326		

Monitor File

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
MONITOR	Speed Meters	44	**[Speed Ref A]** First speed reference for the drive. Negative values apply to four quadrant drives only. Note: This parameter is assigned to analog input 1 (terminals 1 & 2, Par 70 [Anlg In1 Sel]) by default, but can be assigned to any analog input.	Default: Min/Max: Units: (1) The value of [Max Ref Speed] cannot exceed 8192 RPM.	Read Only –/+ Par 45 [Max Ref Speed] (1) RPM	45
		47	**[Speed Ref A Pct]** First speed reference for the drive as a percentage of the value defined in Par 45 [Max Ref Speed].	Default: Min/Max: Units:	Read Only –/+100.00 %	45
		48	**[Speed Ref B]** Second speed reference for the drive. Negative values apply to four quadrant drives only. Note: This parameter can be assigned to an analog input.	Default: Min/Max: Units: (1) The value of [Max Ref Speed] cannot exceed 8192 RPM.	Read Only –/+ Par 45 [Max Ref Speed] (1) RPM	45
		49	**[Speed Ref B Pct]** The second speed reference for the drive as a percentage of the value defined in Par 45 [Max Ref Speed].	Default: Min/Max: Units:	Read Only –/+100.00 %	45
		110	**[Ramp In]** Total reference value input to the ramp in RPM. Note: This parameter can be assigned to an analog output.	Default: Min/Max: Units:	Read Only –/+32766 RPM	
		111	**[Ramp In Pct]** Total reference value input to the ramp as a percentage of Par 45 [Max Ref Speed]. Note: This parameter can be assigned to an analog output.	Default: Min/Max: Units:	Read Only –/+100.00 %	45
		113	**[Ramp Out]** Output of the ramp in RPM. Note: This parameter can be assigned to an analog output.	Default: Min/Max: Units:	Read Only –/+32766 RPM	
		114	**[Ramp Out Pct]** Output of the ramp as a percentage of Par 45 [Max Ref Speed].	Default: Min/Max: Units:	Read Only –/+100.00 %	45
		117	**[Speed Reg In Pct]** Total reference value input to the Speed Regulator as a percentage of Par 45 [Max Ref Speed].	Default: Min/Max: Units:	Read Only –/+100.00 %	
		118	**[Speed Reg In]** Total reference value input to the Speed Regulator in RPM. Note: This parameter can be assigned to an analog output.	Default: Min/Max: Units:	Read Only –/+32766 RPM	
		121	**[Spd Feedback Pct]** Actual speed as a percentage of the Par 45 [Max Ref Speed]. Note: This parameter is assigned to analog output 1 (terminals 21 and 22, Par 66 [Anlg Out1 Sel]) by default, but can be assigned to any analog output.	Default: Min/Max: Units:	Read Only –/+100.00 %	45, 923
		122	**[Spd Feedback]** Actual speed in RPM.	Default: Min/Max: Units:	Read Only –/+32766 RPM	
		384	**[Spd Ref Out Pct]** Output of the Speed Reference selection as a percentage of Par 45 [Max Ref Speed].	Default: Min/Max: Units:	Read Only –/+100.00 %	45
		385	**[Speed Ref Out]** Output of the Speed Reference selection.	Default: Min/Max: Units:	Read Only –/+32766 RPM	
		420	**[Encoder Speed]** Actual speed measured by the digital encoder.	Default: Min/Max: Units:	Read Only –/+8192 RPM	414

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
MONITOR	Speed Meters	924	**[Actual Speed]** Filtered value of Par 122 [Spd Feedback]. Note: This parameter can be assigned to an analog output.	Default: Min/Max: Units:	Read Only –/+32766 RPM	121
		1018	**[Speed Draw Out]** Speed draw output value. Note: This parameter can be assigned to an analog output.	Default: Min/Max: Units: (1) The value of [Max Ref Speed] cannot exceed 8192 RPM.	Read Only –/+ Par 45 [Max Ref Speed] [1] RPM	45
		1019	**[Spd Draw Out Pct]** Speed value as a percentage of Par 45 [Max Ref Speed].	Default: Min/Max: Units:	Read Only –/+100.00 %	45
		1408	**[Tachometer Speed]** Actual speed measured by the DC analog tachometer.	Default: Min/Max: Units:	Read Only –/+32770 RPM	
	Current Meters	10	**[Cur Lim Pos Out]** Displays the value of the current limit for the positive torque direction, expressed as a percentage of the value in Par 179 [Nom Mtr Arm Amps].	Default: Min/Max: Units:	Read Only 0 / 200 %	179
		11	**[Cur Lim Neg Out]** Displays the value of the current limit for the negative torque direction, expressed as a percentage of the value in Par 179 [Nom Mtr Arm Amps].	Default: Min/Max: Units:	Read Only 0 / 200 %	179
		41	**[Current Reg In]** Total current reference value expressed as a percentage of the value in Par 179 [Nom Mtr Arm Amps]. Note: This parameter can be assigned to an analog output.	Default: Min/Max: Units:	Read Only –/+200 %	179
		199	**[Arm Current Pct]** Armature current expressed as a percentage of the value in Par 179 [Nom Mtr Arm Amps]. Note: This parameter is assigned to analog output 2 (Terminals 23 and 24, Par 67 [Anlg Out2 Sel]) by default, but can be assigned to any analog output.	Default: Min/Max: Units:	Read Only –/+250 %	179
		200	**[Arm Current]** Armature current in Amperes.	Default: Min/Max: Units:	Read Only –/+2.5 x [Nom Mtr Arm Amps] A	
		234	**[Fld Current Pct]** Field current (present value) as a percentage of Par 280 [Nom Mtr Fld Amps]. Note: This parameter can be assigned to an analog output.	Default: Min/Max: Units:	Read Only 0.00 / 100.00 %	280
		236	**[Spd Reg Out Pct]** Output value of the speed regulator used as the reference for the current regulator. Note: By default, this parameter is linked to Par 39 [Torque Ref].	Default: Min/Max: Units:	Read Only –/+200 %	39
		351	**[Field Current]** Present value of the field current. The value of this parameter equals the value of Par 468 [Min Fld Curr Pct] when Par 499 [Field Economy En] = 1 “Enabled” and Field Economy becomes active.	Default: Min/Max: Units:	Read Only 0.00 / 99.90 A	
		500	**[Field Ref Pct]** Field current (reference) as a percentage of Par 280 [Nom Mtr Fld Amps]. Note: This parameter can be assigned to an analog output.	Default: Min/Max: Units:	Read Only 0.00 / 100.00 %	280
		928	**[Filt TorqCur Pct]** Percent filtered value of Par 199 [Arm Current Pct]. Note: This parameter can be assigned to an analog output.	Default: Min/Max: Units:	Read Only –/+200 %	1193

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
MONITOR	Drive Data	57	**[FaultCode]** A code that represents the fault that tripped the drive. Refer to Fault Descriptions on page 4-4 for a list of fault codes and descriptions.	Default: Min/Max:	Read Only 0 / 65535	
		233	**[Output Voltage]** Armature Voltage U_{dA} in V_{AV}. Note: This parameter can be assigned to an analog output.	Default: Min/Max: Units:	Read Only -/+999.00 Vdc	
		235	**[Elapsed Lifetime]** Shows the operating time of the drive. This parameter counts the time for which the drive is energized (even if the drive is disabled).	Default: Min/Max: Units:	Read Only 0.00 / 65540.00 H.m	
		300	**[Drive Type]** Displays of the drive type. “10” = Non-Regenerative “11” = Regenerative	Default: Min/Max:	Read Only 10 / 11	
		331	**[Software Version]** Displays the software version number active in the drive.	Default: Min/Max:	Read Only 1.00 / 999.00	
		465	**[Drive Size]** Armature current rating (as indicated by the configuration of DIP switch S15 on the Control board). Note: S15 is set to the appropriate value at the factory. However, if the Control board was supplied as a replacement part, S15 must be manually set to the appropriate drive size. Refer to DIP Switch and Jumper Settings on page 1-28.	Default: Min/Max: Units:	Read Only 0 / Based on drive current rating A	
		466	**[AC Line Voltage]** AC input voltage.	Default: Min/Max: Units:	Read Only 0 / 960 Vac	
		588	**[AC Line Freq]** AC input frequency.	Default: Min/Max: Units:	Read Only 0.00 / 70.00 Hz	
		1052	**[Output Power]** Output power. Note: This parameter can be assigned to an analog output.	Default: Min/Max: Units:	Read Only 0.00 / 9999.99 kW	

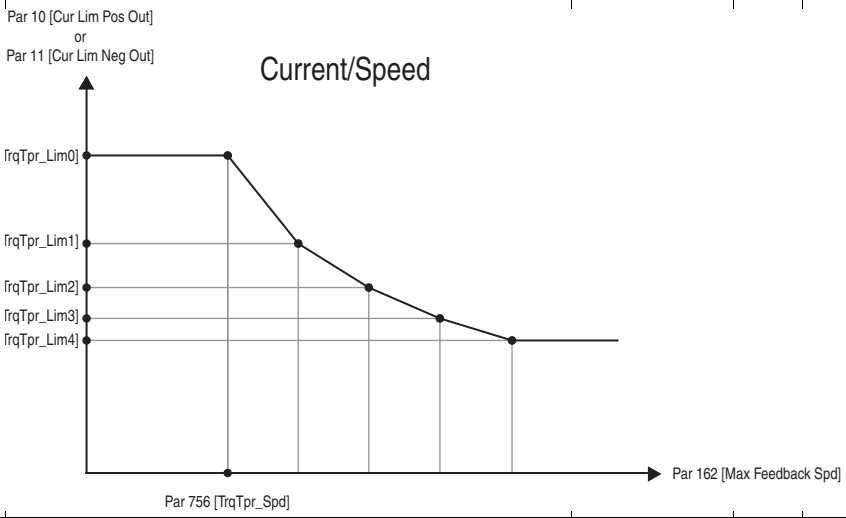
Motor Control File

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
MOTOR CONTROL	Motor Data	45	**[Max Ref Speed]** Maximum reference speed as determined by the application. If Field Weakening is not required, this value will be equal to the Motor Nameplate Base Speed (RPM). The value of this parameter is used to scale all of the other speed reference related parameters.	Default: Min/Max: Units:	1750 1 / 16383 RPM	
		162	**[Max Feedback Spd]** Maximum feedback speed as determined by the application. If Field Weakening is not used, the value of this parameter will be equal to the Motor Nameplate base speed. This value must be at least 10% lower than the Motor nameplate maximum safe speed (in order to allow an "Overspeed" fault to occur). The value in this parameter is also used to convert tachometer and armature feedback values to rpm. When armature voltage feedback is used, the value of Par 175 [Rated Motor Volt] is considered equivalent to Par 162 [Max Feedback Spd]. Therefore, this parameter should be set appropriately.	Default: Min/Max: Units:	1750.00 1.00 / 6553.00 RPM	162, 175
		175	**[Rated Motor Volt]** Maximum armature voltage of the drive. Typically, this value is set to the Motor Nameplate Armature voltage. When Par 469 [Field Mode Sel] is set to 1 = "Field Weaken", the value in this parameter equals the voltage that begins the weakening phase of the field. Note: This parameter affects the threshold of an overvoltage condition, as indicated by an "Arm Overvoltage" fault (F5).	Default: Min/Max: Units:	400.00 20.00 / 999.00 V	469
		179	**[Nom Mtr Arm Amps]** Rated motor nameplate armature current. The settings for the current limit and the overload function are based on this current value.	Default: Min/Max: Units:	Based on drive current rating 0.10 / Based on drive current rating A	
		201	**[Drive Type Sel]** This parameter is only applicable to non-regenerative (2-quadrant) drives. It allows non-regenerative drives to use an external 4-quadrant controller. • "On" = Ramp, Speed, Torque current references and Speed measurement have the same behavior of a four quadrant drive.	Default: Options:	0 = "Off" 0 = "Off" 1 = "On"	
		280	**[Nom Mtr Fld Amps]** Rated motor nameplate field current (I_{dFN}).	Default: Min/Max: Units:	Par 374 [Drv Fld Brdg Cur] x 0.33 0.00 / [Drv Fld Brdg Cur] A	
		374	**[Drv Fld Brdg Cur]** Drive rated field bridge current (I_{dFN}). The value in this field must be set equal to the value chosen with DIP switch S14 on the Control board (refer to Table 1.H on page 1-21 for DIP switch configuration).	Default: Min/Max: Units:	1.00 0.50 / 80.00 A	
	Field Config	91	**[Fld Reg Kp]** Proportional gain (K_P) of the flux regulator expressed as a percentage of Par 97 [Fld Reg Kp Base].	Default: Min/Max: Units:	2.00 0.00 / 100.00 %	97
		92	**[Fld Reg Ki]** Integral gain (K_I) of the flux regulator expressed as a percentage of Par 98 [Fld Reg Ki Base].	Default: Min/Max: Units:	1.00 0.00 / 100.00 %	98
		97	**[Fld Reg Kp Base]** The proportional gain (K_{P0}) of the field current regulator (base value).	Default: Min/Max:	3277.00 0.10 / 32770.00	
		98	**[Fld Reg Ki Base]** Integral gain (K_{I0}) of the field current regulator in (base value).	Default: Min/Max:	3277.00 0.10 / 32770.00	

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
MOTOR CONTROL	Field Config	456	**[Fld Weaken Ratio]** The ratio of Motor Nameplate Base Speed to Par 45 [Max Ref Speed] when Par 469 [Field Mode Sel] = 1 "Field Weaken". It is the percentage of maximum application speed when field weakening will begin. This value is "Motor Base Speed" / Par 45 [Max Ref Speed] x 100. If Par 469 [Field Mode Sel] = 0 "Base Speed", this parameter must be = 100%.	Default: Min/Max: Units:	100 0 / 100 %		
		467	**[Max Fld Curr Pct]** Maximum allowable field current. The maximum value (100%) corresponds to the value set in Par 280 [Nom Mtr Fld Amps]. The value of this field linearly affects the field current, unless a flux curve is set in Pars 916, 917, and 918 [Fld Const xx Pct]. Note: This parameter can be assigned to an analog input or output.	Default: Min/Max: Units:	100 Par 468 [Min Fld Curr Pct] / 100 %		468
		468	**[Min Fld Curr Pct]** Minimum allowable field current. The value set in this parameter also influences the threshold at which the "Field Current Loss" fault occurs. The threshold is half of the value of Par 468 [Min Fld Curr Pct]. The value of Par 351 [Field Current] equals the value of this parameter when Par 499 [Field Economy En] = 1 "Enabled" and Field Economy becomes active.	Default: Min/Max: Units:	30 0 / Par 467 [Max Fld Curr Pct] %		467, 499
		469	**[Field Mode Sel]** Operating mode of the field controller. • "Base Speed" = The motor field is regulated with constant current and controls the motor from zero to motor base speed. If a curve is defined through Pars 916, 917 and 918 [Fld Const xx Pct], this value will change linearly through Par 467 [Max Fld Curr Pct] (which is a percentage of the nominal flux value set in Par 280 [Nom Mtr Fld Amps]). • "Field Weaken" = The motor field is regulated with a combination of torque and constant power (armature and field regulation, i.e., field weakening). The maximum armature voltage is configured in Par 175 [Rated Motor Volt]. • "External" = The motor field power is supplied by an external rectifier/converter (the drive's field output is disabled). Note: This parameter can be assigned to a digital input (35 "Fld Weak En") to allow switching between Base Speed and Field Weakening modes.	Default: Options:	0 = "Base Speed" 0 = "Base Speed" 1 = "Field Weaken" 2 = "External"		916, 917, 918
		497	**[Field Reg Enable]** Enables/Disables the field regulator. • "Enabled" = The field regulator is enabled and controlling the field output. • "Disabled" = The field regulator is disabled. (i.e., The field current is zero.) In addition, Par 473 [FldLoss Flt Cfg] should be set to 0 "Ignore". Note: This parameter can be assigned to a digital input.	Default: Options:	1 = "Enabled" 0 = "Disabled" 1 = "Enabled"		473
		498	**[Force Min Field]** Enables/Disables field weakening. • "Enabled" = The field current corresponds to the value set via Par 468 [Min Fld Curr Pct]. • "Disabled" = The field current is regulated based on the quadrant mode and situation in which the drive is operating.	Default: Options:	0 = "Disabled" 0 = "Disabled" 1 = "Enabled"		
		499	**[Field Economy En]** When this parameter is set to 1 = "Enabled" and the value in Par 107 [Speed Zero Level] is reached, the minimum field current (set via Par 468 [Min Fld Curr Pct]) is produced (field economy). • "Disabled" = Disables the field economy function • "Enabled" = Enables the field economy function	Default: Options:	1 = "Enabled" 0 = "Disabled" 1 = "Enabled"		395, 468

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
MOTOR CONTROL	Field Config	916	**[Fld Const 40 Pct]** Current value at 40% of the field current.	Default: Min/Max: Units:	40.00 0.00 / 100.00 %	469
		917	**[Fld Const 70 Pct]** Current value at 70% of the field current.	Default: Min/Max: Units:	70.00 0.00 / 100.00 %	469
		918	**[Fld Const 90 Pct]** Current value at 90% of the field current.	Default: Min/Max: Units:	90.00 0.00 / 100.00 %	469
		919	**[Set Fld Curve]** When set to “0”, this parameter controls the motor field current to field reference curve according to the values specified in the [Fld Const xx Pct] parameters. With this curve is defined, the result of [Max Fld Curr Pct] / [Field Ref Pct] equals the percentage of field current according to the characteristic of the curve. This field is Write Only. After the value of this field is set to “0”, it will automatically return to “1”.	Default: Min/Max:	1 0 / 1	916, 917, 918
		920	**[Reset Fld Curve]** when set to “1”, resets the drive to use a linear field curve. When this parameter is set, Par 280 [Nom Mtr Fld Amps] is linearly changed through [Max Fld Curr Pct] / [Field Ref Pct]. This field is Write Only. After the value of this field is set to “1”, it will automatically return to “0”.	Default: Min/Max: Units:	0 0 / 1	
		921	**[Out Volt Level]** The percentage of maximum output voltage based on the value in Par 175 [Rated Motor Volt]. This parameter allows you to change the output voltage at the motor end when the drive is in "Field Weaken" mode. Typically set to the default value when the drive is in Field Weakening mode. Note: This parameter can be assigned to an analog output or analog input.	Default: Min/Max: Units:	100.00 0.00 / 100.00 %	
		1407	**[Field Econ Delay]** Amount of time to elapse after the drive reaches zero speed (as determined by Par 107 [Speed Zero Level]) before field economy becomes active.	Default: Min/Max: Units:	300 0 / 1800 s	
	Torq Attributes	7	**[Current Limit]** Symmetrical current limit expressed as a percentage of the value in Par 179 [Nom Mtr Arm Amps]. This value applies to both current directions for four quadrant drives. • If Par 7 [Current Limit] is changed, Pars 8 [Current Lim Pos] and 9 [Current Lim Neg] are set to the same value. If subsequently changed, the value of Pars 8 [Current Lim Pos] and/or 9 [Current Lim Neg] override the value of Par 7 [Current Limit].	Default: Min/Max: Units:	150 0 / 200 %	8, 9, 179
		8	**[Current Lim Pos]** The drive current limit for the positive current direction expressed as a percentage of the value in Par 179 [Nom Mtr Arm Amps]. Note: This parameter can be assigned to an analog input.	Default: Min/Max: Units:	150 0 / 200 %	7
		9	**[Current Lim Neg]** The drive current limit for the negative current direction expressed as a percentage of the value in Par 179 [Nom Mtr Arm Amps]. This parameter is not active for two quadrant drives. Note: This parameter can be assigned to an analog input.	Default: Min/Max: Units:	150 0 / 200 %	7

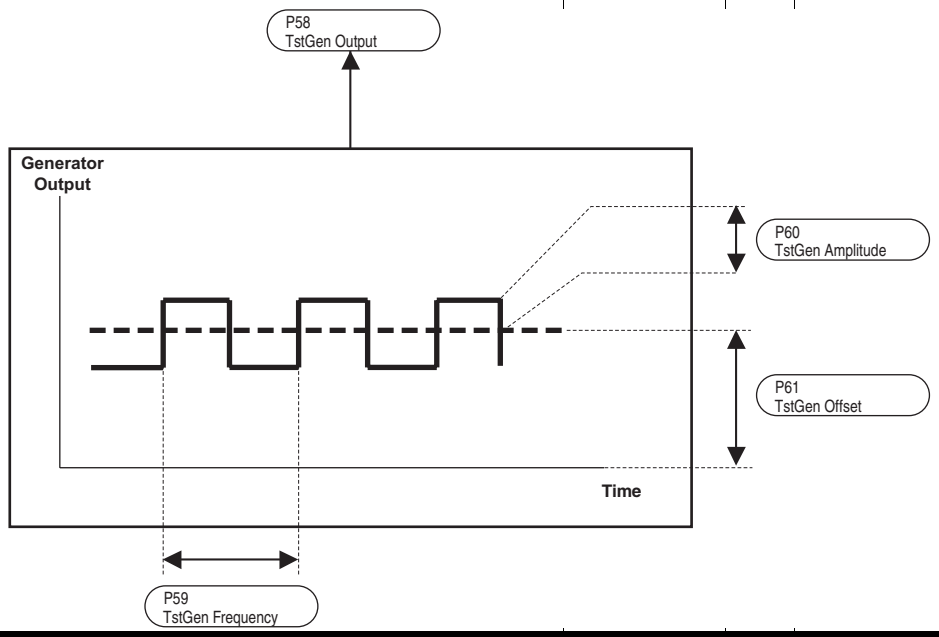
File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
MOTOR CONTROL	Torq Attributes	39	**[Torque Ref]** First current reference value, before any trim signals are incorporated, as a percentage of the value set in Par 179 [Nom Mtr Arm Amps]. This parameter is only used when Par 242 [Speed Reg En] = 0 "Disabled". Note: The current reference value is proportional to the armature current of the motor and determines the torque. The polarity determines the torque direction.	Default: Min/Max: Units:	0 – / +200 %		
		40	**[Trim Torque]** Second current reference value as a percentage of the value set in Par 179 [Nom Mtr Arm Amps]. [Trim Torque] is added to Torque Reference and can be used as a correction value for the torque reference (regardless of the value of Par 242 [Speed Reg En]).	Default: Min/Max: Units:	0 – / +200 %		
		342	**[Torque Reduction]** Selection for torque reduction. When the torque reduction function is active (1 “Active”), the current limit changes accordingly by the percentage defined in Par 13 [Torq Red CurLim]. When this parameter is set to 0 “Not Active”, torque reduction is not active. For example: Par 7 [Current Limit] (or Pars 8 [Current Lim Pos] and 9 [Current Lim Neg]) = 80 % Par 13 [Torq Red CurLim] = 70% If Par 342 [Torque Reduction] = 0 “Not Active”, the current limit = 80 % If Par 342 [Torque Reduction] = 1 “Active”, the current limit = 70 % Note: This parameter can be assigned to a digital input.	Default: Options:	0 = “Not Active” 0 = “Not Active” 1 = “Active”		13
		353	**[Zero Torque]** Sets the reference value for the armature current (Par 41 [Current Reg In]) to zero so that the drive has no torque. • “Not Active” = Par 41 [Current Reg In] is not set to zero. • “Active” = Par 41 [Current Reg In] is set zero. The drive has no torque.	Default: Options:	1 = “Not Active” 0 = “Active” 1 = “Not Active”		41

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
MOTOR CONTROL	Torq Attributes	750	**[TrqTpr_Enable]** Enables/Disables the current/speed function. The current/speed function allows you to change the current limits set in Pars 8 [Current Lim Pos] and 9 [Current Lim Neg] by setting up to five setpoints using parameters [TrqTpr_Limx] and a threshold speed in Par 756 [TrqTpr_Spd]. • "Disabled" = The limits current /speed curve is disabled • "Enabled" = The limits current /speed curve is enabled 	Default: Options:	0 = 0 = 1 =	"Disabled" "Disabled" "Enabled"	751, 752, 753, 754, 755, 756
		751	**[TrqTpr_Lim0]** The current limit of the current/speed curve that operates constantly up to the speed set in Par 756 [TrqTpr_Spd]. The value specified in this parameter overrides the values specified in Pars 8 [Current Limit Pos] and 9 [Current Lim Neg].	Default: Min/Max: Units:	0 0 / 200 %		750, 756
		752	**[TrqTpr_Lim1]** First reduced current limit of the current/speed curve. The value defined in this parameter must be less than the value in Par 751 [TrqTpr_Lim0] and greater than the values in Pars 753 [TrqTpr_Lim2], 754 [TrqTpr_Lim3] and 755 [TrqTpr_Lim4].	Default: Min/Max: Units:	0 0 / 200 %		750, 756
		753	**[TrqTpr_Lim2]** Second reduced current limit of the current/speed curve. The value defined in this parameter must be less than the value in Par 752 [TrqTpr_Lim1] and greater than the values in Pars 754 [TrqTpr_Lim3] and 755 [TrqTpr_Lim4].	Default: Min/Max: Units:	0 0 / 200 %		750, 756
		754	**[TrqTpr_Lim3]** Third reduced current limit of the current/speed curve. The value defined in this parameter must be less than the value in Par 753 [TrqTpr_Lim2] and greater than the value in Par 755 [TrqTpr_Lim4].	Default: Min/Max: Units:	0 0 / 200 %		750, 756
		755	**[TrqTpr_Lim4]** Last reduced current limit of the current/speed curve. The value defined in this parameter must be less than the value in Par 754 [TrqTpr_Lim3]. The drive will operate at this current limit up to the value set in parameter 162 [Max Feedback Spd].	Default: Min/Max: Units:	0 0 / 200 %		750, 756
		756	**[TrqTpr_Spd]** Threshold speed at which torque reduction begins, as determined by the current/speed curve.	Default: Min/Max: Units:	0 0 / Par 162 RPM		750, 756
		926	**[Filt Torq Cur]** First rate low-pass filter for Par 1193 [Torq Current Pct].	Default: Min/Max: Units:	0.100 0.001 / 0.250 s		1193

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
MOTOR CONTROL	Speed Feedback	169	**[Encoder PPR]** Number of pulses per revolution of the digital encoder. The value of Pars 169 [Encoder PPR] and 162 [Max Feedback Spd] must be set as indicated in Speed Feedback on page C-12.	Default: Min/Max:	1024.00 100.00 / 32770.00		162
		414	**[Fdbk Device Type]** The source of speed feedback. • 1 “Encoder” = Digital encoder • 2 “DC Tach” = DC analog tachometer • 3 “Armature” = Internal measurement of the armature voltage	Default: Options:	3 = 1 = 2 = 3 =	“Armature” “Encoder” “DC Tach” “Armature”	
		455	**[Spd Fdbk Error]** The maximum allowable speed feedback error expressed as a percentage of the maximum output voltage set in Par 175 [Rated Motor Volt]. By means of Par 175 [Rated Motor Volt], Par 456 [Fld Weaken Ratio] and the motor nominal speed, a relationship between motor speed and armature voltage is obtained. If the difference is higher than the value set in Par 455 [Spd Fdbk Error], an “Encoder Loss” fault (F91) occurs.	Default: Min/Max: Units:	22 0 / 100 %		
		457	**[Spd Fdbk Control]** Enables/Disables speed feedback control. This function controls the speed feedback, where a comparison is made between the armature voltage and the speed value read by the encoder or tachometer. When the value set in Par 455 [Spd Fdbk Error] is signaled, the fault message “Encoder Loss” (F91) displays. This function is automatically disabled when the armature feedback has been selected (Par 414 [Fdbk Device Type] = 3 “Armature”).	Default: Options:	1 = 0 = 1 =	“Enabled” “Disabled” “Enabled”	455
			ATTENTION: If speed feedback control is disabled (Par 457 [Spd Fdbk Control] set to 0 “Disabled” and Par 414 [Device Type] is set to 1 “Encoder”, the motor could run at excessive speed or become damaged, which could result in personal injury or destruction of equipment.				
		458	**[SpdReg FB Bypass]** Enables/Disables an automatic switch to armature feedback when the “Encoder Loss” (F91) fault occurs due to an encoder or tachometer feedback loss. When this parameter is set to “Enable”, Par 478 [Spd Loss Flt Cfg] must be set to 1 “Alarm”. After an automatic switch to armature feedback, the speed regulator works with Pars 459 [SpdReg Kp Bypass] and 460 [SpdReg Ki Bypass] and the D derivative part of the speed regulator is automatically excluded. Pars [SpdReg Kp Bypass] and [SpdReg Ki Bypass] must be properly tuned. An automatic switch to armature feedback can only be accomplished when running the motor with constant field current.	Default: Options:	0 = 0 = 1 =	“Disabled” “Disabled” “Enabled”	478
		562	**[Anlg Tach Gain]** Fine scaling of the speed feedback received from the DC analog tachometer (Par 414 [Fdbk Device Type] = 2 “DC Tach”). The voltage feedback value received from the tachometer is multiplied by this value.	Default: Min/Max:	1.00 0.90 / 3.00		
		563	**[Anlg Tach Zero]** Offset scaling of the feedback circuit.	Default: Min/Max: Units:	0.00 –/+20.00 RPM		
		652	**[Encoder Err Chk]** Enables/Disables monitoring of the digital encoder connection status. When an alarm is detected, the HIM displays the “Encoder Loss” (F91) fault. This parameter can be programmed on a digital output. This function is activated by setting Par 457 [Spd Fdbk Control] = “Enabled”.	Default: Options:	0 0 = 1 =	“Disabled” “Disabled” “Enabled”	457

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
MOTOR CONTROL	Speed Feedback	911	**[Z Channel Enable]** Determines whether the encoder zero pulse (qualification signal or "zero cam") will be read by the drive. This parameter is used for systems implementing position control. • "Enabled" = The encoder zero pulse is read. • "Disabled" = The encoder zero pulse is not read.	Default: Options:	0 = 0 = 1 =	"Disabled" "Disabled" "Enabled"	
		912	**[Z Capture Pos En]** Control register of the zero pulse and of the encoder qualification signal.	Default: Min/Max:	0 0 / 6553		
		913	**[Z Captured Pos]** Data and function status register.	Default: Min/Max:	Read Only 0 / 2^{32}–1		
		923	**[Act Spd Filter]** First order low pass filter time constant for Par 121 [Spd Feedback Pct].	Default: Min/Max: Units:	0.100 0.001 / 1.000 s		121
		1021	**[Encoder Out Sel]** Defines the speed reference to which the encoder signal can be input. This parameter is typically set to 0 "Off" and the encoder is used for speed feedback only. When set to other than 0 "Off", the choice of the speed reference destination must be made according to the configuration of the speed regulator (for example "Speed Ref A" cannot be used with an active ramp).	Default: Options:	0 = 0 = 1 = 2 = 3 = 4 =	"Off" "Off" "Trim Ramp" "Trim Speed" "Speed Ref A" "Speed Ref B"	
	Autotune	452	**[CurrReg Autotune]** Setting this parameter to 1 "On" and pressing Enter on the HIM keypad initiates the current regulator auto tuning procedure. When the auto tuning procedure is complete, this parameter automatically resets to 0 "Off". The resulting armature resistance and inductance values are set in parameters 453 [Arm Resistance] and 454 [Arm Inductance], respectively.	Default: Options:	0 = 0 = 1 =	"Off" "Off" "On"	
		453	**[Arm Resistance]** Motor armature resistance. This parameter can be manually changed to a value other than the value obtained when the current regulator auto tuning is completed.	Default: Min/Max: Units:	0.50 Based on drive current rating Ohm		452
		454	**[Arm Inductance]** Motor armature inductance. This parameter can be manually changed to a value other than the value obtained when the current regulator auto tuning is completed.	Default: Min/Max: Units:	4.00 Based on drive current rating mH		452
		587	**[I Reg Error]** The auxiliary signal used to determine whether the current regulator is correctly tuned. The value should be as near to zero as possible, but values between -/+40 are acceptable.	Default: Min/Max: Units:	Read Only –/+80 V		452
		1012	**[Inertia C Filter]** First order low–pass filter used to reduce noise caused by the speed differentiation process in the Inertia/Loss compensation block.	Default: Min/Max: Units:	0 0 / 1000 ms		
		1013	**[Torque Const]** The Motor torque constant used to calculate inertia and friction compensation. The value in this parameter is automatically adapted in the field weakening mode. This value is determined during speed auto tuning.	Default: Min/Max: Units:	Based on drive current rating 0.01 / 99.99 N–m/A		
		1014	**[Inertia]** Motor inertia value. 1 Kg–m^2 = 23.76 lb–ft^2	Default: Min/Max: Units:	Based on drive current rating 0.001 / 999.999 Kg–m^2		
		1015	**[Friction]** Motor friction value. 1 N–m = 0.738 lb–ft	Default: Min/Max: Units:	Based on drive current rating 0.000 / 99.990 N–m		

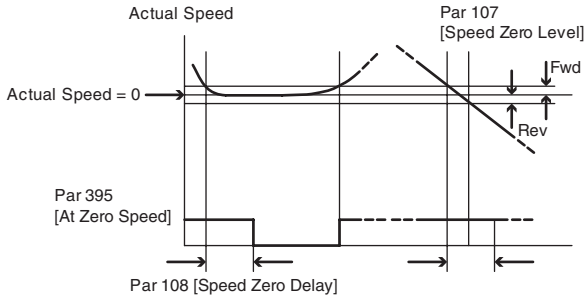
File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
MOTOR CONTROL	Autotune	1027	**[Spd Reg Autotune]** Starts the auto tuning procedure for the speed regulator. Setting this parameter to 1 "On" and pressing Enter on the HIM keypad initiates the speed regulator auto tuning procedure. When the auto tuning procedure is complete, this parameter automatically resets to 0 "Off".	Default: Options:	0 = 0 = 1 =	"Ready" "Ready" "Start"	
		1029	**[Speed Tune Dir]** Choice of the rotation direction of the motor shaft (rotation, as seen from the motor shaft side) for the speed regulator auto tuning procedure. • "Forward" = Clockwise rotation • "Reverse" = Counter-clockwise rotation	Default: Options:	1 = 1 = 2 =	"Forward" "Forward" "Reverse"	
		1030	**[Spd Tune Inertia]** Motor inertia value identified during the speed regulator auto tuning procedure.	Default: Min/Max: Units:	Read Only 0.00 / 1000.00 Kg x m^2		
		1031	**[SpdTune Friction]** Motor friction value identified during the speed regulator auto tuning procedure.	Default: Min/Max: Units:	Read Only 0.00 / 99.99 N-m		
		1032	**[Speed Tune Kp]** Proportional gain value of the speed regulator identified during the speed regulator auto tuning procedure.	Default: Min/Max:	Read Only 0.00 / 100.00		
		1033	**[Speed Tune Ki]** Integral gain value of the speed regulator identified during the speed regulator auto tuning procedure.	Default: Min/Max:	Read Only 0.00 / 100.00		
		1048	**[Autotune Cur Lim]** Value of the torque current limit applied during the speed regulator auto tuning procedure.	Default: Min/Max: Units:	20 0 / Based on drive current rating %		

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
MOTOR CONTROL	Test Generator	58	**[TstGen Output]** Allows you to select a simulated parameter as the output for the test generator. The test generator is used to manually tune the regulators. It consists of a square wave generator whose frequency, offset and amplitude can be manipulated. • "NotConnected" - No internal parameters defined by the generator. • "Reserved" - Not used. • "Torq Cur Ref" - The output of the generator defines the reference value of the torque current. 100% corresponds to "full load torque current" (FLT). • "Field Ref" - The output of the generator defines the field reference value. 100% corresponds to the rated field current based on the motor nameplate data parameters. • "Ramp Ref" - The output of the generator defines the ramp reference value. 100% corresponds to the value specified in Par 45 [Max Ref Speed]. This is the value immediately before the Ramp function. • "Speed Ref" - The output of the generator defines the speed reference value. This is the value immediately before the Speed Regulator function.  	Default: Options:	0 = 0 = 1 = 2 = 3 = 4 = 5 =	"NotConnected" "NotConnected" "Reserved" "Torq Cur Ref" "Field Ref" "Ramp Ref" "Speed Ref"	59, 60, 61
		59	**[TstGen Frequency]** Output frequency of the test generator.	Default: Min/Max: Units:	0.10 0.10 / 62.50 Hz		58
		60	**[TstGen Amplitude]** Amplitude of the delta signal produced by the test generator.	Default: Min/Max: Units:	0.00 0.00 / 200.00 %		58
		61	**[TstGen Offset]** Offset of the test generator.	Default: Min/Max: Units:	0.00 –/+200.00 %		58

Speed Command File

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
SPEED COMMAND	Limits	1	**[Minimum Speed]** Defines the minimum speed of the drive. This value applies to both directions of motor rotation for four quadrant drives. A speed below the value set in [Minimum Speed] is not possible, regardless of the set speed reference value. If the value of [Minimum Speed] is changed, Pars 5 [Min Speed Fwd] and 6 [Min Speed Rev] are set to the same value. If either Par 5 [Min Speed Fwd] or Par 6 [Min Speed Rev] is changed later, the last change is valid.	Default: Min/Max: Units:	0 0 / Par 45 [Max Ref Speed] RPM	5, 6
		2	**[Maximum Speed]** Defines the maximum speed of the drive. This value applies to both directions of motor rotation for four quadrant drives. The value of this parameter is input to the speed regulator and therefore takes into account the reference value that comes from the ramp as well as the direction of rotation. If the value of [Maximum Speed] is changed, Pars 3 [Max Speed Fwd] and 4 [Max Speed Rev] are set to the same value. If either Par 3 [Max Speed Fwd] or Par 4 [Max Speed Rev] is changed later, the last change is valid.	Default: Min/Max: Units:	1750 0 / Par 45 [Max Ref Speed] RPM	3, 4
		3	**[Max Speed Fwd]** Defines the maximum speed for forward (clockwise) rotation of the motor. The value of [Max Speed Fwd] affects the input of the speed regulator and therefore takes into account both the reference values that come from the ramp as well as the direction of motor rotation.	Default: Min/Max: Units:	1750 0 / Par 45 [Max Ref Speed] RPM	2
		4	**[Max Speed Rev]** Defines the maximum speed for reverse (counterclockwise) rotation of the motor for four quadrant drives only. The value of [Max Speed Rev] affects the input of the speed regulator and therefore takes into account both the reference values that come from the ramp as well as the direction of rotation.	Default: Min/Max: Units:	1750 0 / Par 45 [Max Ref Speed] RPM	2
		5	**[Min Speed Fwd]** Defines the minimum speed for forward (clockwise) rotation of the motor. Speed reference values below the value in this parameter are clamped until the reference exceeds this limit.	Default: Min/Max: Units:	0 0 / Par 45 [Max Ref Speed] RPM	1
		6	**[Min Speed Rev]** Defines the minimum speed for reverse (counterclockwise) rotation of the motor for four quadrant drives only. Speed reference values below the value in this parameter are clamped until the reference exceeds this limit.	Default: Min/Max: Units:	0 0 / Par 45 [Max Ref Speed] RPM	1
	Discrete Speeds	154 155 156 157 158 159 160	**[Preset Speed 1]** **[Preset Speed 2]** **[Preset Speed 3]** **[Preset Speed 4]** **[Preset Speed 5]** **[Preset Speed 6]** **[Preset Speed 7]** Provides an internal fixed speed command value. In bipolar mode, direction is commanded by the sign of the reference. Note: [Preset Speed 1] cannot be directly selected by the Speed Sel digital inputs. However, Par 154 [Preset Speed 1] can be directed to Par 42 [Trim Ramp] via the Scale Block parameters.	Default: Default: Default: Default: Default: Default: Default: Min/Max: Units:	150 300 600 900 1200 1500 1750 -32768 / +32767 RPM	
		266	**[Jog Speed]** Reference value for jog mode. Note: This parameter can be assigned to an analog input.	Default: Min/Max: Units:	100 -/+32767 RPM	
		267	**[TB Manual Ref]** Reference value for the drive when the Terminal Block asserts Manual reference control. Note: This parameter can be assigned to an analog input.	Default: Min/Max: Units:	0 –/+ Par 45 [Max Ref Speed] (1) RPM (1) The value of [Max Ref Speed] cannot exceed 8192 RPM.	

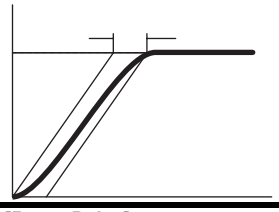
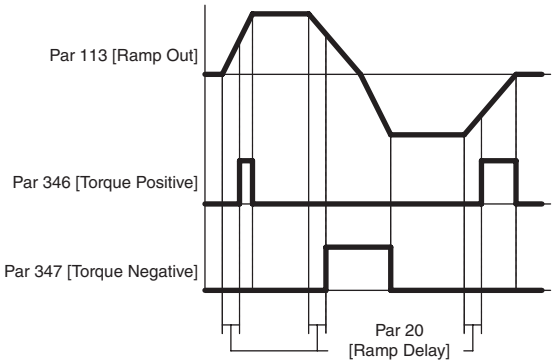
File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
SPEED COMMAND	Speed References	42	**[Trim Ramp]** This value is added to the speed reference just before the Speed Ramp function. Note: This parameter can be assigned to an analog input.	Default: Min/Max: Units: (1) The value of Par 45 [Max Ref Speed] cannot exceed 8192 RPM.	0 –/+Par 45 [Max Ref Speed] (1) RPM	378 i
		43	**[Trim Speed]** This value is added to the speed reference just before the speed regulator (and after the Speed Ramp function). Note: This parameter can be assigned to an analog input.	Default: Min/Max: Units: (1) The value of Par 45 [Max Ref Speed] cannot exceed 8192 RPM.	0 –/+ Par 45 [Max Ref Speed] (1) RPM	379 i
		378	**[Trim Ramp Pct]** Trim ramp value defined as a percentage of the value defined in Par 45 [Max Ref Speed].	Default: Min/Max: Units:	0.00 –/+100.00 %	42
		379	**[Trim Speed Pct]** Trim speed reference value defined as a percentage of the of the value defined in Par 45 [Max Ref Speed].	Default: Min/Max: Units:	0.00 –/+100.00 %	43
		1017	**[Speed Ratio]** Determines the speed ratio value for the Speed-Draw function. Note: This value can be input to the drive digitally, or via an analog input.	Default: Min/Max:	10000 0 / 32767	i
	Speed Regulator	87	**[Spd Reg Kp]** Proportional gain of the speed regulator that can be adjusted while the drive is running.	Default: Min/Max: Units:	10.00 0.00 / 100.00 %	93, 99
		88	**[Spd Reg Ki]** Integral gain of the speed regulator that can be adjusted while the drive is running.	Default: Min/Max: Units:	1.00 0.00 / 100.00 %	94, 100
		93	**[Spd Reg Kp Base]** The proportional gain (K_{P0}) of the speed regulator (base value).	Default: Min/Max: Units:	0.30 x Par 93_{max} 0.01 / Based on drive current rating A / RPM	87, 99
		94	**[Spd Reg Ki Base]** The integral gain (K_{I0}) of the speed regulator (base value).	Default: Min/Max: Units:	0.30 x Par 94_{max} 0.01 / Based on drive current rating A/ RPM x ms	88, 100
		99	**[Spd Reg Kp Outpt]** Displays the active proportional coefficient of the speed regulator as a percentage of the value defined in Par 93 [Spd Reg Kp Base].	Default: Min/Max: Units:	Read Only 0.00 / 100.00 %	87, 93
		100	**[Spd Reg Ki Outpt]** Displays the active integral coefficient of the speed regulator as a percentage of the value defined in Par 94 [Spd Reg Ki Base].	Default: Min/Max: Units:	Read Only 0.00 / 100.00 %	88, 94
		101	**[Speed Thresh Pos]** Threshold speed for the drive above or below which the value of Par 393 [Speed Threshold] changes. When the speed of the drive exceeds the value of this parameter, Par 393 [Speed Threshold] displays “Above Thresh” (0). When the speed of the drive is below the value of this parameter, Par 393 [Speed Threshold] displays “Below Thresh” (1).	Default: Min/Max: Units:	1000 1 / 32767 RPM	393 i
		102	**[Speed Thresh Neg]** Threshold speed for the drive above or below which the value of Par 393 [Speed Threshold] changes. When the speed of the drive exceeds the value specified in this parameter, Par 393 [Speed Threshold] displays “Above Thresh” (0). When the speed of the drive is below this threshold, Par 393 [Speed Threshold] displays “Below Thresh” (1).	Default: Min/Max: Units:	1000 1 / 32767 PRM	393 i

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
SPEED COMMAND	Speed Regulator	103	**[Threshold Delay]** Amount of time that must elapse before indication that the drive speed is above the value set in Par 101 [Speed Thresh Pos] or below the value set in Par 102 [Speed Thresh Neg].	Default: Min/Max: Units:	100 0 / 65535 ms		393
		104	**[At Speed Error]** Defines the speed above and below the speed reference (in Par 118 [Speed Reg In]) at which the value of Par 394 [At Speed] changes. When the difference between the speed reference and the actual speed is greater than the value of this parameter, Par 394 [At Speed] displays "Not Equal" (0). When the difference between the speed reference and the actual speed is less than the value of this parameter, Par 394 [At Speed] displays "Equal" (1).	Default: Min/Max: Units:	100 1 / 32767 RPM		394
		105	**[At Speed Delay]** Amount of time that must elapse before indication that the drive speed reference is within the range specified in Par 104 [At Speed Error] occurs.	Default: Min/Max: Units:	100 0 / 65535 ms		394
		106	**[Ref Zero Level]** Speed below which speed references are equal to zero speed. Switch used in the Speed Zero function.	Default: Min/Max: Units:	20 1 / 32767 RPM		123, 124, 125, 126
		107	**[Speed Zero Level]** Speed below which the actual speed is considered equal to zero. When a Stop command is issued and actual speed goes below this value, drive output is disabled. The value applies to both rotation directions for four quadrant drives. Note: Setting the value of this parameter too low could prevent the proper functioning of field economy.  	Default: Min/Max: Units:	20 1 / 32767 RPM		395
		108	**[Speed Zero Delay]** Amount of time that must elapse after the actual speed goes below the value set in Par 107 [Speed Zero Level] before Par 395 [At Zero Speed] changes state.	Default: Min/Max: Units:	100 0 / 65535 ms		395
		123	**[Spd Zero I En]** Enables/Disables the output of the integral section of the speed regulator. Used in the Zero Speed function. • "Enabled" = The output of the integral section of the speed regulator is set to zero when the speed reference and the speed feedback are equal to zero. The I component is enabled when a reference value is entered to restart acceleration. • "Disabled" = Disables the output of the integral section of the speed regulator.	Default: Options:	0 = 0 = 1 =	"Disable" "Disable" "Enable"	

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
SPEED COMMAND	Speed Regulator	124	**[Spd Ref Zero En]** This parameter is only active when Par 125 [Spd Zero P En] = 1 "Enabled". Used in the Zero Speed function. • "Enabled" = The proportional gain, equal to Par 126 [Spd Zero P Gain] at zero speed, is equal to Par 87 [Spd Reg Kp] when the speed reference is higher than the value defined in Par 106 [Ref Zero Level]. • "Disabled" = The proportional gain, equal to Par 126 [Spd Zero P Gain] at zero speed, is equal to the value in Par 87 [Spd Reg Kp] when the speed reference or the actual speed is higher than the value defined in Par 106 [Ref Zero Level].	Default: Options:	0 = 0 = 1 =	"Disable" "Disable" "Enable"	
		125	**[Spd Zero P En]** "Enabled" = When both the speed reference value and the actual speed value = 0, the proportional gain value in Par 126 [Spd Zero P Gain] is active after the delay time defined in Par 108 [Speed Zero Delay]. Used in the Zero Speed function. "Disabled" = The speed regulator keeps its proportional gain component when the drive is stopped.	Default: Options:	0 = 0 = 1 =	"Disable" "Disable" "Enable"	
		126	**[Spd Zero P Gain]** The proportional gain of the speed regulator that is only active when the value of the speed reference and actual speed = 0. This parameter is only active when Par 125 [Spd Zero P En] = 1 "Enabled". Used in the Zero Speed function.	Default: Min/Max: Units:	10.00 0.00 / 100.00 %		
		242	**[Speed Reg En]** Enables/Disables the speed regulator output to the torque/current regulator. • "Enabled" = The speed regulator output is connected to the input of the torque/current regulator. • "Disabled" = The speed regulator output is not connected to the input of the torque/current regulator. Par 39 [Torque Ref] is connected to the input of the current regulator.	Default: Options:	1 = 0 = 1 =	"Enabled" "Disabled" "Enabled"	39, 41, 236
		348	**[Lock Speed Integ]** Enables or disables the integral (I) function of the speed regulator. • "Not active" = The integral component of the speed regulator is enabled. • "Active" = The integral component of the speed regulator is disabled.	Default: Options:	1 = 0 = 1 =	"Not active" "Active" "Not active"	
		388	**[Flying Start En]** Enables/Disables the ability of the drive to connect to a spinning motor at actual RPM when a start command is issued. • "Enabled" = When the drive is turned on, the speed of the motor is measured and the ramp output is set accordingly. The drive then runs at the set reference value. • "Disabled" = When the drive is turned on, the ramp starts from zero. Main uses: • To connect to a motor that is already spinning due to its load (e.g. in the case of pumps, the flowing medium). • Re–connection to a spinning motor after a fault or alarm. Note: If the Flying Start function is disabled, ensure that the motor is not spinning when the drive is turned on, or harsh motor deceleration in current limit may occur.	Default: Options:	0 = 0 = 1 =	"Disabled" "Disabled" "Enabled"	
		444	**[Spd Fdbk Filter]** Time constant used by the filter for the Speed Feedback circuit. Filtering of the high frequency components of the speed feedback signal is useful in the case of elastic coupling between the motor and load (i.e., joints or belts).	Default: Min/Max: Units:	0 0 / 1000 ms		121, 122

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
SPEED COMMAND	Speed Regulator	445	**[Spd Up Gain Pct]** The Speed Up function gain as a percentage of Par 446 [Speed Up Base].	Default: Min/Max: Units:	0.00 0.00 / 100.00 %	
		446	**[Speed Up Base]** The Speed Up function maximum gain. This value corresponds to 100% of Par 445 [Spd Up Gain Pct].	Default: Min/Max: Units:	1000.00 0.00 / 16000.00 ms	
		447	**[Speed Up Filter]** The time constant of the filter for the D (derivative) component of the Speed Up function.	Default: Min/Max: Units:	0 0 / 1000 ms	
		459	**[SpdReg Kp Bypass]** The proportional gain (K_P) of the speed regulator, expressed as a percentage of Par 93 [Spd Reg Kp Base], when an encoder or tachometer feedback signal is changed to armature feedback (Par 458 [SpdReg FB Bypass] = "Enabled").	Default: Min/Max: Units:	10.00 0.00 / 100.00 %	458
		460	**[SpdReg Ki Bypass]** The integral gain (K_I) of the speed regulator, expressed as a percentage of Par 94 [Spd Reg Ki Base], when an encoder or tachometer feedback signal is changed to armature feedback (Par 458 [SpdReg FB Bypass] = "Enabled").	Default: Min/Max: Units:	1.00 0.00 / 100.00 %	458
		493	**[Arm Volt Kp]** Proportional gain (K_P) of the field voltage regulator expressed as a percentage of the value defined in Par 495 [Arm Volt Kp Base].	Default: Min/Max: Units:	30.00 0.00 / 100.00 %	495
		494	**[Arm Volt Ki]** Integral gain (K_I) of the field voltage regulator expressed as a percentage of the value defined in Par 496 [Arm Volt Ki Base].	Default: Min/Max: Units:	40.00 0.00 / 100.00 %	496
		495	**[Arm Volt Kp Base]** The proportional gain (K_{P0}) of the field voltage regulator (base value).	Default: Min/Max: Units:	Based on drive current rating 0.10 / Based on drive current rating A / V	493
		496	**[Arm Volt Ki Base]** The integral coefficient (K_{I0}) of the field voltage regulator (base value).	Default: Min/Max: Units:	Based on drive current rating 0.01 / Based on drive current rating A / V / ms	494
		1016	**[SpdFuncSelect]** Selection of the "Speed Up" or "Inertia/Loss compensation" function. Note that these two functions are mutually exclusive - if one is selected, the other is off.	Default: Options:	0 = "Speed Up" 0 = "Speed Up" 1 = "Inertia/loss"	444, 445, 447, 1012, 1013, 1014, 1015
		1191	**[InertiaCompAct]** Displays the active compensation of the fixed section as a percentage of the drive rated current.	Default: Min/Max: Units:	Read Only 0.00 / 200.00 %	
		1192	**[InertiaCompVar]** Displays the active compensation of the variable section as a percentage of the drive rated current.	Default: Min/Max: Units:	Read Only 0.00 / 200.00 %	

Dynamic Control File

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
DYNAMIC CONTROL	Ramp Rates	18	**[Ramp Type Select]** Determines the type of ramp used. • 0 “Linear” = Linear ramp • 1 “S-Shaped” = S–shaped ramp	Default: Options:	0 = 0 = 1 =	“Linear” “Linear” “S-Shaped”	
		19	**[S Curve Time]** S-shaped curve time constant. The value of Par 19 [S Curve Time] is added to the ramp time of linear ramps, regardless of speed changes. If the value of [S Curve Time] is changed, Pars 665 and 667 [S Curve Accel x] and 666 and 668 [S Curve Decel x] are set to the same value. If any of parameters 665-668 are changed later, the last change is valid. S Curve Time 	Default: Min/Max: Units:	1.00 0.10 / 60.00 s		18, 665, 666, 667, 668
		20	**[Ramp Delay]** Defines a ramp delay time when the ramp is active. Works with par [Digital Outx Sel] set to 6 “Ramp Pos” or 7 “Ramp Neg”. 	Default: Min/Max: Units:	100 0 / 65535 ms		113, 346, 347
		22	**[MOP Accel Time]** The acceleration rate for the MOP reference in response to a digital input. The MOP acceleration rate = Par 2 [Maximum Speed] / Par 22 [MOP Accel Time]. If “0” is entered in this parameter, the ramp output directly follows the reference value.	Default: Min/Max: Units:	10 0 / 65535 s		2
		24	**[Accel Time 2]** Sets the rate of acceleration for Ramp 2. Acceleration rate for Ramp 2 = Par 2 [Maximum Speed] / Par 24 [Accel Time 2].	Default: Min/Max: Units:	10 0 / 65535 s		2
		30	**[MOP Decel Time]** The deceleration rate for the MOP reference in response to a digital input. The MOP deceleration rate = Par 2 [Maximum Speed] / Par 30 [MOP Decel Time].	Default: Min/Max: Units:	10 0 / 65535 s		2

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
DYNAMIC CONTROL	Ramp Rates	32	**[Decel Time 2]** Sets the rate of deceleration for Ramp 2. Deceleration rate for Ramp 2 = Par 2 [Maximum Speed] / Par 30 [Decel Time 2].	Default: Min/Max: Units:	10 0 / 65535 s		2
		245	**[Speed Ramp En]** Enables or disables the ramp function. The Ramp Reference block is bypassed when this parameter is set to 0 "Disabled".	Default: Options:	1 = 0 = 1 =	"Enabled" "Disabled" "Enabled"	
		344	**[Zero Ramp Output]** Activates either the ramp output (1) or the brake function (0). When this parameter is set to 0 "Active", the drive brakes through the maximum available torque and the motor will perform a Current Limit Stop. Two quadrant drives do not support a brake option. • "Active" = The ramp output is disabled and Pars 113 [Ramp Out] and 114 [Ramp Out Pct] are immediately set to zero. • "Not Active" = The ramp output is enabled. and Pars 113 [Ramp Out] and 114 [Ramp Out Pct] follow the Ramp Reference block commands.	Default: Options:	1 = 0 = 1 =	"Not Active" "Active" "Not Active"	
		345	**[Zero Ramp Input]** Activates or deactivates the ramp input. • "Active" = The ramp input is not active and Pars 110 [Ramp In] and 111 [Ramp In Pct] = 0. • "Not Active" = The ramp input is activated and Pars 110 [Ramp In] and 111 [Ramp In Pct] correspond to the set reference.	Default: Options:	1 = 0 = 1 =	"Not Active" "Active" "Not Active"	110, 111
		373	**[Freeze Ramp]** Determines whether the last ramp output reference value is retained or whether the ramp output reference value is active. • "Active" = The value of the ramp output at the time of activation is retained irrespective of any possible reference value changes at the ramp input. • "Not Active" = The ramp output value follows the ramp input value according to the Ramp Reference Block commands.	Default: Options:	1 = 0 = 1 =	"Not Active" "Active" "Not Active"	
		660	**[Accel Time 1]** Sets the rate of acceleration for Ramp 1. Acceleration rate for Ramp 1 = Par 2 [Maximum Speed] / Par 660 [Accel Time 1].	Default: Min/Max: Units:	10 0 / 65535 s		2
		662	**[Decel Time 1]** Sets the rate of deceleration for Ramp 1. Deceleration rate for Ramp 1 = Par 2 [Maximum Speed] / Par 662 [Decel Time 1].	Default: Min/Max: Units:	10 0 / 65535 s		2
		665	**[S Curve Accel 1]** Defines the acceleration curve for S–shaped ramp 1.	Default: Min/Max: Units:	1.00 0.10 / 60.00 s		
		666	**[S Curve Decel 1]** Defines the deceleration curve for S–shaped ramp 1.	Default: Min/Max: Units:	1.00 0.10 / 60.00 s		
		667	**[S Curve Accel 2]** Defines the acceleration curve for S–shaped ramp 2.	Default: Min/Max: Units:	1.00 0.10 / 60.00 s		
		668	**[S Curve Decel 2]** Defines the deceleration curve for S–shaped ramp 2.	Default: Min/Max: Units:	1.00 0.10 / 60.00 s		
		1212	**[Acc Dec Filter]** Internal acceleration/deceleration calculation filter for the Torque Winder line speed reference.	Default: Min/Max: Units:	30 0 / 5000 ms		

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
DYNAMIC CONTROL	Load Limits	13	**[Torq Red CurLim]** The armature current limit, defined as a percentage of the value defined in Par 179 [Nom Mtr Arm Amps] when Par 342 [Torque Reduction] is set to 1 "Active".	Default: Min/Max: Units:	100 0 / 200 %		342
		696	**[Droop Percent]** Droop function gain is a percentage of the ratio between Par 45 [Max Ref Speed] and the difference of Par 698 [Load Comp] – Par 41 [Current Reg In]. Therefore, when the difference between Par 698 [Load Comp] and Par 41 [Current Reg In] = 100% and Par 696 [Droop Percent] = 100%, the speed reference correction signal is equal to Par 45 [Max Ref Speed].	Default: Min/Max: Units:	0.00 0.00 / 100.00 %		41, 45, 698
		697	**[Droop Filter]** Droop filter time constant for the Droop function.	Default: Min/Max: Units:	0 0 / 1000 ms		
		698	**[Load Comp]** The load compensation signal. This value is typically equal to the "master" drive's current. The load compensation signal is a percentage of I_{dn}.	Default: Min/Max: Units:	0 + / –200 %		
		699	**[Enable Droop]** Enables/Disables the Droop function. • "Enabled" = The Droop function is enabled. • "Disabled" = The Droop function is disabled. Note: This parameter can be assigned to a digital input.	Default: Options:	0 = 0 = 1 =	"Disabled" "Disabled" "Enabled"	
		700	**[Droop Limit]** The speed reference correction range within which the droop function becomes active.	Default: Min/Max: Units:	1750 0 / Par 45 [Max Ref Speed] RPM		
		715	**[Torq Limit Type]** This parameter determines the response of the drive during a current limiting condition. • "Torq Lim Pos Neg" = The active positive torque limit is set by the value defined in Par 7 [Current Limit] and the active negative torque limit defined in Par 9 [Current Lim Neg]. • "Torq Lim Mtr Gen" = With this selection three conditions are possible: 1. If the motor speed > +1% of Par 162 [Max Feedback Spd], the active positive torque limit is defined by Par 8 [Current Lim Pos] and the active negative torque limit is defined by Par 9 [Current Lim Neg]. 2. If the motor speed < –1% of Par 162 [Max Feedback Spd] the active positive torque limit is defied by Par 9 [Current Lim Neg] and the active negative torque limit is defined by Par 8 [Current Lim Pos]. 3. If –1% of Par 162 [Max Feedback Spd] < motor speed < +1% of Par 162 [Max Feedback Spd] the active positive torque limit is define by Par 8 [Current Lim Pos] and the active negative torque limit is defined by Par 9 [Current Lim Neg].	Default: Options:	0 = 0 = 1 =	"Torq Lim Pos Neg" "Torq Lim Pos Neg" "Torq Lim Mtr Gen"	7, 8, 9, 162
	Stop Modes	38	**[Fast Stop Time]** The amount of time to decelerate the drive to a complete stop and disable the drive. The deceleration rate for Fast stop = [Maximum Speed] / [Fast Stop Time]. This feature can be used when [Digital Inx Sel] is set to 30 "Fast Stop" or when certain faults are configured for "Quick Stop".	Default: Min/Max: Units:	10 0 / 65535 s		354, 365
		627	**[Spd 0 Trip Delay]** The amount of time that will elapse after the drive reaches zero speed before it is disabled.	Default: Min/Max: Units:	0 0 / 40000 ms		

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
DYNAMIC CONTROL	Stop Modes	1262	**[Closing Speed]** Motor speed at which the brake is closed. Used with External Brake Control.	Default: Min/Max: Units:	30 0 / 200 RPM		
		1263	**[Opening Delay]** Amount of time before the brake will open after the drive has been enabled. Used with External Brake Control.	Default: Min/Max: Units:	0 0 / 30000 ms		
		1265	**[Ramp In Zero En]** Enables/Disables the setting of the ramp input to zero. Used with External Brake Control.	Default: Options:	0 = 0 = 1 =	"Disabled" "Disabled" "Enabled"	
		1266	**[Actuator Delay]** Amount of time before the actuator releases the load. Used with External Brake Control.	Default: Min/Max: Units:	0 0 / 30000 ms		
	Restart Modes	1344	**[Start At Powerup]** Enables/Disables the ability to issue a "Run" command and automatically resume running at commanded speed after drive input power is restored and the time in Par 1345 [Powerup Delay] has elapsed. Requires a digital input configured for "Run" and a valid start condition. **ATTENTION:** Equipment damage and/or personal injury may result if this parameter is used in an inappropriate application. Do not use this function without considering applicable local, national and international codes, standards, regulations or industry guidelines.	Default: Options:	0 = 0 = 1 =	"Disabled" "Disabled" "Enabled"	1345
		1345	**[Powerup Delay]** Defines the programmed delay time, in seconds, before a start command is accepted after a power up. If a "Start", "Run" or "Stop" command is asserted before the time in this parameter expires, the "Start At Powerup" function will be aborted.	Default: Min/Max: Units:	1 1 / 10800 s		1344
	Adaptv Regulator	181	**[Adaptive Spd En]** Enables/Disables adaptive speed regulation. The adaptive speed regulator function enables different gains of the speed regulator depending on the speed or another variable (Par 183 [Adaptive Ref]). This allows optimum adaptation of the speed regulator to your specific application. When adaptive speed regulation is disabled, the regulator operates based on the settings in the individual regulation parameters.	Default: Options:	0 = 0 = 1 =	"Disabled" "Disabled" "Enabled"	182, 183
		182	**[Adaptive Reg Typ]** Selects the type of regulation used. • "Speed" = The regulator parameters follow a speed reference. • "Adaptive Ref" = The regulator parameters follow the reference produced by Par 183 [Adaptive Ref].	Default: Options:	0 = 0 = 1 =	"Speed" "Speed" "Adaptive Ref"	183
		183	**[Adaptive Ref]** The variable reference that the speed regulator parameter will follow when Par 182 [Adaptive Reg Typ] = 1 "Adaptive Ref".	Default: Min/Max: Units:	1000 –32768/+32767 RPM		182
		184	**[Adaptive Spd 1]** A percentage of Par 45 [Max Ref Speed] or the maximum value of Par 183 [Adaptive Ref]. Parameter set 1 is valid below the value set in this parameter and parameter set 2 is valid above the value set in this parameter. The transition between the values is defined by Par 186 [Adaptive Joint 1].	Default: Min/Max: Units:	20.34 0.00 / 200.00 %		183, 186
		185	**[Adaptive Spd 2]** A percentage of Par 45 [Max Ref Speed] or the maximum value of Par 183 [Adaptive Ref]. Parameter set 2 is valid below the value set in this parameter and parameter set 3 is valid above the value set in this parameter. The transition between the values is defined by Par 187 [Adaptive Joint 2].	Default: Min/Max: Units:	40.69 0.00 / 200.00 %		183, 187

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
DYNAMIC CONTROL	Adaptv Regulator	186	**[Adaptive Joint 1]** Defines a range above and below the value set in Par 184 [Adaptive Spd 1] within which there is a linear change in gain from parameter set 1 to parameter set 2 in order to prevent jumps in the adaptive speed regulator. The value in this parameter is defined as percentage of the value defined Par 45 [Max Ref Speed].	Default: Min/Max: Units:	6.11 0.00 / 200.00 %	184
		187	**[Adaptive Joint 2]** Defines a range above and below the value set in Par 185 [Adaptive Spd 2] with in which there is a linear change in gain from parameter set 2 to parameter set 3 in order to prevent jumps in the adaptive speed regulator. The value in this parameter is defined as percentage of the value defined Par 45 [Max Ref Speed].	Default: Min/Max: Units:	6.11 0.00 / 200.00 %	185
		188	**[Adaptive P Gain1]** Proportional gain for the range from zero to the value set in Par 184 [Adaptive Spd 1]. The value in this parameter is defined as percentage of the value defined in Par 93 [Spd Reg Kp Base].	Default: Min/Max: Units:	10.00 0.00 / 100.00 %	93, 184
		189	**[Adaptive I Gain1]** Integral gain for the range from zero to Par 184 [Adaptive Spd 1]. The value in this parameter is defined as percentage of the value defined Par 94 [Spd Reg Ki Base].	Default: Min/Max: Units:	1.00 0.00 / 100.00 %	94, 184
		190	**[Adaptive P Gain2]** Proportional gain for the range of values defined beginning with the value of Par 184 [Adaptive Spd 1] to the value defined in Par 185 [Adaptive Spd 2]. The value in this parameter is defined as percentage of the value defined Par 93 [Spd Reg Kp Base].	Default: Min/Max: Units:	10.00 0.00 / 100.00 %	93, 184, 185
		191	**[Adaptive I Gain2]** Integral gain for the range of values defined beginning with the value of Par 184 [Adaptive Spd 1] to the value defined in Par 185 [Adaptive Spd 2]. The value in this parameter is defined as percentage of the value defined Par 94 [Spd Reg Ki Base].	Default: Min/Max: Units:	1.00 0.00 / 100.00 %	94, 184, 185
		192	**[Adaptive P Gain3]** Proportional gain for the range of values beginning above the value defined in Par 185 [Adaptive Spd 2]. The value in this parameter is defined as percentage of the value defined Par 93 [Spd Reg Kp Base].	Default: Min/Max: Units:	10.00 0.00 / 100.00 %	93, 185
		193	**[Adaptive I Gain3]** Integral gain for the range of values beginning above the value defined in Par 185 [Adaptive Spd 2]. The value in this parameter is defined as percentage of the value defined Par 94 [Spd Reg Ki Base].	Default: Min/Max: Units:	1.00 0.00 / 100.00 %	94, 185

Applications File

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
APPLICATIONS	PI Control	695	**[PI Steady Thrsh]** Feed–forward threshold for PI. • If the value if Par 758 [Feed Fwd PID] is less than the value of Par 695 [PI Steady Thrsh] the integral regulation will be locked and the proportional gain assumes the value set in Par 793 [PI Init Prop Gn]. • When the value of Par 758 [Feed Fwd PID] exceeds the value of Par 695 [PI Steady Thrsh], the integral regulation with the gain set in Par 734 [PI Init Intgl Gn] will be enabled. • The Proportional / Integral (PI) block will maintain the gain values specified in Pars 793 [PI Init Prop Gn] and 734 [PI Init Intgl Gn] for the time specified in Par 731 [PID Steady Delay]; once this time delay has elapsed, the values of [PI Init Prop Gn] and [PI Init Intgl Gn] will be brought automatically to the values specified in Pars 765 [PI Prop Gain PID] and 764 [PI Integral Gain], respectively.	Default: Min/Max:	0 0 / 10000	758
		764	**[PI Integral Gain]** Integral gain of the PI block.	Default: Min/Max:	10.00 0.00 / 100.00	
		765	**[PI Prop Gain PID]** Proportional gain of the PI block.	Default: Min/Max:	10.00 0.00 / 100.00	
		769	**[Enable PI]** Enables/Disables the PI portion of the PID regulator. If assigned to a digital input, this parameter must be brought at a high logical level (+24V).	Default: Options:	0 = "Disabled" 0 = "Disabled" 1 = "Enabled"	
		771	**[PI Output]** Output value of the PI block, adapted to the value between the values defined in Pars 784 [PI Upper Limit] and 785 [PI Lower Limit]. When the drive is turned on, the value of this parameter is acquired automatically based on the value of Par 779 [PI Central v sel] x 1000.	Default: Min/Max:	Read Only 0 / 10000	784, 785, 779
		776	**[PI Central v1]** The first value that can be selected, via Par 779 [PI Central v sel], as the initial output of the PID regulator's integral component (corresponding to initial diameter 1). The value entered in this parameter must be less than the value set in Par 784 [PI Upper Limit] and greater than the value set in Par 785 [PI Lower Limit].	Default: Min/Max:	0.00 Par 785 [PI Lower Limit] / Par 784 [PI Upper Limit]	784, 785, 779
		777	**[PI Central v2]** The second value that can be selected, via Par 779 [PI Central v sel], as the initial output of the PID regulator's integral component (corresponding to initial diameter 2). The value entered in this parameter must be less than the value set in Par 784 [PI Upper Limit] and greater than the value set in Par 785 [PI Lower Limit].	Default: Min/Max:	0.00 Par 785 [PI Lower Limit] / Par 784 [PI Upper Limit]	784, 785, 779
		778	**[PI Central v3]** The third value that can be selected, via Par 779 [PI Central v sel], as the initial output of the PID regulator's integral component (corresponding to initial diameter 3). The value entered in this parameter must be less than the value set in Par 784 [PI Upper Limit] and greater than the value set in Par 785 [PI Lower Limit]. Note: This parameter can be assigned to an analog input.	Default: Min/Max:	0.00 Par 785 [PI Lower Limit] / Par 784 [PI Upper Limit]	784, 785, 779

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
APPLICATIONS	PI Control	779	**[PI Central v sel]** Selects one of the four possible initial output values of the PID regulator integral component (corresponding to the initial diameter) of the PI block. • "0" = When the PI block is disabled (Par 769 [Enable PI] = "Disabled"), the last value of the integral component calculated (corresponding to swift diameter) is stored in Par 771 [PI Output]. This value is used by the PID regulator when the PI block is enabled again and the drive is restarted. This function is useful when for any reason the drive must be turned off or if incoming power is removed from the drive. • "1", "2", or "3" = When the PI block is disabled (Par 769 [Enable PI] = "Disabled"), the value of [PI Output] will be set to the value of the selected parameter ("1" = 776 [PI Central v1], "2" = 777, [PI Central v2], or "3" = 778 [PI Central v3] x1000). This value is only used by the PID regulator when the drive is powered up and Par 769 [Enable PI] is already enabled. Note: Par 779 [PI Central v sel] can be set directly from the HIM or through two digital inputs set respectively as "PI central vs0" and "PI central vs1". Refer to Pars 780 [PI Central vs0] and 781 [PI Central vs1] for more information on this configuration.	Default: Min/Max:	1 0 / 3	769, 776, 777, 778, 780, 781
		780	**[PI Central vs0]** When assigned to a digital input and used in combination with Par 781 [PI Central vs1], through binary selection, determines which of the four possible output values is used as the initial level of the integral component (corresponding to the initial diameter) of the PI block. **Par 780 / Par 781 / Selects the value in . . .** 0 / 0 / Par 771 [PI Output] 0 / 1 / Par 776 [PI Central v1] 1 / 0 / Par 777 [PI Central v2] 1 / 1 / Par 778 [PI Central v3]	Default: Min/Max:	0 0 / 1	
		781	**[PI Central vs1]** The output selector of the initial PI block. With the value of Par 780 [PI Central vs0] determined, through binary selection, what between the four possible settings of the integral initial level (correspondent to initial diameter) can be used. See Par 780 [PI Central vs0] for binary selections.	Default: Min/Max:	0 0 / 1	
		783	**[PI integr freeze]** Locks the selections made for the integral component of the PID regulator.	Default: Options:	0 = "Off" 0 = "Off" 1 = "On"	
		784	**[PI Upper Limit]** Defines the upper limit of the adapting block for correction of the PI block.	Default: Min/Max:	10.00 Par 785 [PI Lower Limit] / 10.00	
		785	**[PI Lower Limit]** Defines the lower limit of the adapting block for correction of the PI block.	Default: Min/Max:	0.00 –10.00 / Par 784 [PI Upper Limit]	
		793	**[PI Init Prop Gn]** The initial value of the proportional gain. This parameter is active when, • its value has exceeded the value of Par 695 [PI Steady Thrsh], • the amount of time defined in Par 731 [PID Steady Delay] has elapsed, and feed–forward is less than the value defined in Par 695 [PI Steady Thrsh], or • Par 769 [Enable PI] transitions from "0" (low) to "1" (high) and the amount of time defined in Par 731 [PID Steady Delay] has elapsed.	Default: Min/Max:	10.00 0.00 / 100.00	695, 731, 769

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
APPLICATIONS	PD Control	421	**[PD Output PID]** Proportional / Derivative (PD) block output.	Default: Min/Max:	Read Only –/+10000	
		766	**[PD Deriv Gain 1]** First derivative gain of the PD block. The value specified in this field depends on the enabling and configuration of Par 181 [Adaptive Spd En].	Default: Min/Max:	1.00 0.00 / 100.00	181
		767	**[PD Deriv Filter]** Time constant of the filter from the derivative portion of the PD block.	Default: Min/Max: Units:	0 1 / 1000 ms	
		768	**[PD Prop Gain 1]** First proportional gain of the block PD. The value specified in this field depends on the enabling and configuration of Par 181 [Adaptive Spd En].	Default: Min/Max:	10.00 0.00 / 100.00	181
		770	**[Enable PD]** Enables/disables the PD portion of the PID regulator. Note: This parameter can be assigned to a digital input.	Default: Options:	0 = "Disabled" 0 = "Disabled" 1 = "Enabled"	
		788	**[PD Prop Gain 2]** Second proportional gain of the block PD. The value specified in this field depends on the enabling and configuration of Par 181 [Adaptive Spd En].	Default: Min/Max:	10.0 0.0 / 100.0	181
		789	**[PD Deriv Gain 2]** Second derivative gain of the PD block. The value specified in this field depends on the enabling and configuration of Par 181 [Adaptive Spd En].	Default: Min/Max:	10.0 0.0 / 100.0	181
		790	**[PD Prop Gain 3]** Third proportional gain of the block PD. The value specified in this field depends on the enabling and configuration of Par 181 [Adaptive Spd En].	Default: Min/Max:	10.0 0.0 / 100.0	181
		791	**[PD Deriv Gain 3]** Third derivative gain of the PD block. The value specified in this field depends on the enabling and configuration of Par 181 [Adaptive Spd En].	Default: Min/Max:	1.00 0.00 / 100.00	181
	PID Control	418	**[Real FF PID]** Represents the feed–forward value which has been recalculated according to the PI correction. It will be calculated with the following formula: Par 418 [Real FF PID] = (Par 758 [Feed Fwd PID] / 1000) x Par 771 [PI Output] When either the negative or positive limit of this parameter has been reached, further increases in the value of Par 771 [PI Output] will be blocked in order to avoid undesirable saturation of the PID regulator. For example: When Par 758 [Feed Fwd PID] = +8000, the positive limit of Par 771 [PI Output] will be automatically set at 10000 / (8000 / 1000) = 1250.	Default: Min/Max:	Read Only –/+10000	758, 771
		731	**[PID Steady Delay]** The amount of time for which the gains in Pars 793 [PI Init Prop Gn] and 734 [PI Init Intgl Gn] will remain enabled after feed–forward has exceeded the threshold value defined in Par 695 [PI Steady Thrsh].	Default: Min/Max: Units:	0 0 / 60000 ms	695, 734, 793
		734	**[PI Init Intgl Gn]** The initial value of the integral gain. This parameter is active when feed–forward is greater than the value defined in Par 695 [PI Steady Thrsh], or Par 769 [Enable PI] transitions from "0" (low) to "1" (high) and the amount of time defined in Par 731 [PID Steady Delay] has elapsed.	Default: Min/Max:	10.00 0.00 / 100.00	695, 731, 769

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
APPLICATIONS	PID Control	757	**[PID Clamp]** The PID "clamp" allows a smooth tension setting of a controlled system winder/unwinder when the calculation of the initial diameter function cannot be used. • When enabling the drive, the dancer is at the lowest point of its full scale. In this case, with Par 759 [PID Error] at its maximum value, the motor could accelerate too fast to properly configure the dancer for its central operating position. By setting the value of Par 757 [PID Clamp] sufficiently low. e.g, = 1000, when the drive starts and Par 770 [Enable PD] = 1 "Enable", the value of Par 759 [PID Error] is limited to 1000 until the signal coming from the dancer (via Par 763 [PID Feedback]) goes above the value in this field. Then, the value of [PID Clamp] is automatically returned to its maximum value of 10000. The PID clamp is kept at 10000 until the drive stops or Par 770 [Enable PD] = 0 "Disabled".	Default: Min/Max:	10000 0 / 10000	759, 763, 770
		758	**[Feed Fwd PID]** Feedback from the transducer position (dancer) or tension.	Default: Min/Max:	Read Only –/+10000	
		759	**[PID Error]** Error value input to the PID function (output of the PID Clamp block).	Default: Min/Max:	Read Only –/+10000	
		760	**[PID Setpoint 0]** First offset value added to Par 763 [PID Feedback]. This parameter can be assigned to an analog input, e.g., for the tension setting when a load cell must be used as feedback.	Default: Min/Max:	0 –/+10000	763
		761	**[PID Setpoint 1]** Second offset value added to Par 763 [PID Feedback].	Default: Min/Max:	0 –/+10000	763
		762	**[PID Setpoint Sel]** Selects the offset value added to Par 763 [PID Feedback]. This parameter can be assigned to a digital input.	Default: Options:	0 = "Setpoint 0" 0 = "Setpoint 0" 1 = "Setpoint 1"	763
		763	**[PID Feedback]** Analog input feedback value received from the transducer position (dancer) or tension (load cell).	Default: Min/Max:	0 –/+10000	
		772	**[PID Output Sign]** Determines whether the output of the PID regulator is bipolar or positive (clamp of the negative side).	Default: Options:	1 = "Bipolar" 0 = "Positive" 1 = "Bipolar"	
		773	**[PID Output Scale]** Scale factor for Par 774 [PID Output]. The value of this parameter depends on to which parameter you want to send the PID regulator output.	Default: Min/Max:	1.00 –/+100.00	774
		774	**[PID Output]** Displays the PID regulator output. Note: This parameter can be assigned to an analog output in order to provide a cascaded reference in multi-drive systems.	Default: Min/Max:	Read Only –/+10000	

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
APPLICATIONS	PID Control	782	**[PID Target]** Parameter number to which the PID Output value will be written. Options:	Default: Min/Max: Units:	0 = 0 / 746 –	"Not Used" "Not Used" / "Reserved" –	
		786	**[PID Source]** Parameter number from which the PID source value will be read. Options:	Default: Min/Max: Units:	0 0 / 746 –	"Not Used" "Not Used" / "Reserved" –	
		787	**[PID Source Gain]** Gain of the input value to Par 786 [PID Source].	Default: Min/Max: Units:	1.00 –/+100.00 –		786
		1046	**[PID Accel Time]** Ramp acceleration time after the block PID offset.	Default: Min/Max: Units:	0.00 0.00 / 900.00 s		
		1047	**[PID Decel Time]** Ramp deceleration time after the block PID offset.	Default: Min/Max: Units:	0.00 0.00 / 900.00 s		

Options for [PID Target]

0 =	"Not Used"	16 =	"Reserved"	32 =	"UsrDefined13" (Par 516)
1 =	"Cur Lim Pos" (Par 8)	17 =	"Max Fld Pct" (Par 467)	33 =	"UsrDefined14" (Par 517)
2 =	"Cur Lim Neg" (Par 9)	18 =	"Reserved"	34 =	"UsrDefined15" (Par 518)
3 =	"Reserved"	19 =	"UsrDefined0" (Par 503)	35 =	"Load Comp" (Par 698)
4 =	"Reserved"	20 =	"UsrDefined1" (Par 504)	36 =	"Out Volt Lvl" (Par 921)
5 =	"TrqRedCurLim" (Par 13)	21 =	"UsrDefined2" (Par 505)	37 =	"Reserved"
6 =	"Torque Ref" (Par 39)	22 =	"UsrDefined3" (Par 506)	38 =	"Speed Ratio" (Par 1017)
7 =	"Trim Torque" (Par 40)	23 =	"UsrDefined4" (Par 507)	39 =	"Reserved"
8 =	"Reserved"	24 =	"UsrDefined5" (Par 508)	40 =	"Reserved"
9 =	"Trim Ramp" (Par 42)	25 =	"UsrDefined6" (Par 509)	41 =	"Tension Red" (Par 1179)
10 =	"Trim Speed" (Par 43)	26 =	"UsrDefined7" (Par 510)	42 =	"Reserved"
11 =	"Reserved"	27 =	"UsrDefined8" (Par 511)	43 =	"Reserved"
12 =	"Reserved"	28 =	"UsrDefined9" (Par 512)	44 =	"CloseLp Comp" (Par 1208)
13 =	"Reserved"	29 =	"UsrDefined10" (Par 513)	45 =	"Reserved"
14 =	"Adaptive Ref" (Par 183)	30 =	"UsrDefined11" (Par 514)	46 =	"Reserved"
15 =	"Reserved"	31 =	"UsrDefined12" (Par 515)		

Options for [PID Source]

0 =	"Not Used"	16 =	"SpdRegOutPct" (Par 236)	32 =	"UsrDefined13" (Par 516)
1 =	"Cur Lim Pos" (Par 8)	17 =	"Max Fld Pct" (Par 467)	33 =	"UsrDefined14" (Par 517)
2 =	"Cur Lim Neg" (Par 9)	18 =	"Fld Ref Pct" (Par 500)	34 =	"UsrDefined15" (Par 518)
3 =	"CurLimPosOut" (Par 10)	19 =	"UsrDefined0" (Par 503)	35 =	"Load Comp" (Par 698)
4 =	"CurLimNegOut" (Par 11)	20 =	"UsrDefined1" (Par 504)	36 =	"Out Volt Lvl" (Par 921)
5 =	"TrqRedCurLim" (Par 13)	21 =	"UsrDefined2" (Par 505)	37 =	"Filt Trq Cur" (Par 928)
6 =	"Torque Ref" (Par 39)	22 =	"UsrDefined3" (Par 506)	38 =	"Speed Ratio" (Par 1017)
7 =	"Trim Torque" (Par 40)	23 =	"UsrDefined4" (Par 507)	39 =	"Spd Draw Out" (Par 1018)
8 =	"TorqueReg In" (Par 41)	24 =	"UsrDefined5" (Par 508)	40 =	"Roll Diam" (Par 1154)
9 =	"Trim Ramp" (Par 42)	25 =	"UsrDefined6" (Par 509)	41 =	"Tension Red" (Par 1179)
10 =	"Trim Speed" (Par 43)	26 =	"UsrDefined7" (Par 510)	42 =	"Torq Cur Pct" (Par 1193)
11 =	"Ramp In" (Par 110)	27 =	"UsrDefined8" (Par 511)	43 =	"Ten Ref Pct" (Par 1194)
12 =	"Ramp Out" (Par 113)	28 =	"UsrDefined9" (Par 512)	44 =	"CloseLp Comp" (Par 1208)
13 =	"Speed Reg In" (Par 118)	29 =	"UsrDefined10" (Par 513)	45 =	"Actual Comp" (Par 1213)
14 =	"Adaptive Ref" (Par 183)	30 =	"UsrDefined11" (Par 514)	46 =	"W Reference" (Par 1217)
15 =	"Arm Cur Pct" (Par 199)	31 =	"UsrDefined12" (Par 515)		

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
APPLICATIONS	PID Control	1254	**[PID Error Gain]** Gain percentage of Par 759 [PID Error].	Default: Min/Max: Units:	1.005 0.000 / 32.010 %	759
		1258	**[Enable PID]** Enables/Disables both the PI and PD portions of the PID regulator.	Default: Options:	0 = "Disabled" 0 = "Disabled" 1 = "Enabled"	
	Scale Blocks	484 553 1218 1227 1236 1245	**[Scale1 Input]** **[Scale2 Input]** **[Scale3 Input]** **[Scale4 Input]** **[Scale5 Input]** **[Scale6 Input]** Parameter number from which the value is read and used as the input quantity to the Scale block. Refer to the Scale Blocks block diagram on page D-18 for more information.	Default: Min/Max:	0 0 / 1408	
		485 554 1219 1228 1237 1246	**[Scale1 Output]** **[Scale2 Output]** **[Scale3 Output]** **[Scale4 Output]** **[Scale5 Output]** **[Scale6 Output]** Parameter number to which the value of the Scale block output is written. Refer to the Scale Blocks block diagram on page D-18 for more information.	Default: Min/Max:	0 0 / 1408	
		486 555 1220 1229 1238 1247	**[Scale1 Mul]** **[Scale2 Mul]** **[Scale3 Mul]** **[Scale4 Mul]** **[Scale5 Mul]** **[Scale6 Mul]** Multiplier of the input quantity (after a possible limitation). Resolution: 5 digits. Refer to the Scale Blocks block diagram on page D-18 for more information.	Default: Min/Max:	1.00 –/+10000.00	
		487 556 1221 1230 1239 1248	**[Scale1 Div]** **[Scale2 Div]** **[Scale3 Div]** **[Scale4 Div]** **[Scale5 Div]** **[Scale6 Div]** Divisor, through which it is possible to divide the input quantity already multiplied and limited. Resolution: 5 digits. Refer to the Scale Blocks block diagram on page D-18 for more information.	Default: Min/Max:	1.00 –/+10000.00	
		488 557 1222 1231 1240 1249	**[Scale1 In Max]** **[Scale2 In Max]** **[Scale3 In Max]** **[Scale4 In Max]** **[Scale5 In Max]** **[Scale6 In Max]** Maximum limit of the input quantity. Resolution: 5 digits. Refer to the Scale Blocks block diagram on page D-18 for more information.	Default: Min/Max:	0.00 $-2^{31}/+2^{31}-1$	
		489 558 1223 1232 1241 1250	**[Scale1 In Min]** **[Scale2 In Min]** **[Scale3 In Min]** **[Scale4 In Min]** **[Scale5 In Min]** **[Scale6 In Min]** Minimum limit of the input quantity. Resolution: 5 digits. Refer to the Scale Blocks block diagram on page D-18 for more information.	Default: Min/Max:	0.00 $-2^{31}/+2^{31}-1$	

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
APPLICATIONS	Scale Blocks	490 559 1224 1233 1242 1251	**[Scale1 In Off]** **[Scale2 In Off]** **[Scale3 In Off]** **[Scale4 In Off]** **[Scale5 In Off]** **[Scale6 In Off]** Offset to be added to the input quantity. Resolution: 5 digits. Refer to the Scale Blocks block diagram on page D-18 for more information.	Default: Min/Max:	0.00 $-2^{31}/+2^{31}-1$		
		491 560 1225 1234 1243 1252	**[Scale1 Out Off]** **[Scale2 Out Off]** **[Scale3 Out Off]** **[Scale4 Out Off]** **[Scale5 Out Off]** **[Scale6 Out Off]** Offset to be added to the output quantity. Resolution: 5 digits. Refer to the Scale Blocks block diagram on page D-18 for more information.	Default: Min/Max:	0.00 $-2^{31}/+2^{31}-1$		
		492 561 1226 1235 1244 1253	**[Scale1 In Abs]** **[Scale2 In Abs]** **[Scale3 In Abs]** **[Scale4 In Abs]** **[Scale5 In Abs]** **[Scale6 In Abs]** Controls how the input value is processed. • "Off" = The input quantity is processed with its sign. • "On" = The input quantity is processed with a positive sign (absolute value). It is possible to have the polarity change with the signs of the [ScalexMul] or [ScalexDiv] parameters. Refer to the Scale Blocks block diagram on page D-18 for more information.	Default: Options:	0 = 0 = 1 =	"Off" "Off" "On"	
	Diameter Calc	794	**[Diameter Calc]** Enables/Disables the diameter calculation function. If this parameter has been programmed via a digital input, it must be brought to a logical high level. • "0" = The diameter calculation is disabled. • "1" = The diameter calculation is enabled.	Default: Min/Max:	0 0 / 1		
		795	**[DncrPosSpd]** Desired motor speed when the dancer is positioned in its central working position.	Default: Min/Max:	0 –/+100		
		796	**[Max Deviation]** A value, expressed in counts of D/A, that corresponds to the position of maximum shift admitted by the dancer. This value is considered the starting measurement of the dancer movement during the initial diameter calculation phase.	Default: Min/Max:	8000 –/+10000		
		797	**[Gear Box Ratio]** Ratio reduction between the motor and the swift (< = 1).	Default: Min/Max:	1.000 0.000 / 1.000		
		798	**[Dancer Constant]** The measurement corresponding to the total bunching of the material in the dancer.	Default: Min/Max: Units:	1 1 / 10000 mm		
		799	**[Minimum Diameter]** Minimum value of the swift diameter.	Default: Min/Max: Units:	100 1 / 2000 mm		
		800	**[Diameter Calc St]** Status of the initial diameter calculation. • "0" = The initial diameter calculation has not completed. • "1" = The initial diameter calculation has completed. Note: This parameter can be assigned to a digital output.	Default: Min/Max:	Read Only 0 / 1		

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
APPLICATIONS	Diameter Calc	1153	**[Max Diameter]** Maximum roll diameter.	Default: Min/Max: Units:	1.00 0.00 / 32.00 m	
		1154	**[Roll Diameter]** Displays the calculated roll diameter. Note: This parameter can be assigned to an analog output as a percentage of Par 1153 [Max Diameter].	Default: Min/Max: Units:	Read Only 0.00 / 32.00 m	
		1155	**[Line Spd Thresh]** Line speed detecting threshold. When the value of Par 1286 [Ref Line Speed] is lower than the value of [Line Spd Thresh], the diameter calculation stops and the diameter is kept at a constant value. When the value of [Ref Line Speed] overcomes the threshold, the diameter calculation is enabled with an initial filter corresponding to the value in Par 1206 [Diam init filter] for the time set in Par 1207 [Diam stdy delay]. At the end of this time the filter will be set to the value of Par 1162 [Diameter Filter].	Default: Min/Max: Units:	5.00 0.00 / 150.00 %	1162, 1206, 1207, 1286
		1156	**[Line Spd Gain]** Calibration value used to obtain Par 1160 [Line Speed Pct] = 100% at its maximum value. The value of this parameter depends on the value of Par 1284 [Ref Spd Source]: [Line Spd Gain] = [32768 x 16384 / (maximum value of [Ref Spd Source] x 8)] -1	Default: Min/Max:	0 0 / 32767	1160, 1284
		1157	**[Diameter Reset]** Diameter reset. When this parameter is set to "1", the diameter starting value is set to the value in Par 1168 [Diam Preset Sel].	Default: Min/Max:	0 0 / 1	1168
		1158	**[Diam Threshold]** Diameter threshold as a percentage of Par 1153 [Max Diameter]. Par 1159 [Diameter Reached] is set to "1" when the value in this parameter is exceeded.	Default: Min/Max: Units:	10.00 0.00 / 150.00 %	1153, 1159
		1159	**[Diameter Reached]** Indication that the diameter threshold set in Par 1158 [Diam Threshold] has been exceeded. • "0" = The diameter threshold has not been exceeded. • "1" = The diameter threshold has been exceeded.	Default: Min/Max:	Read Only 0 / 1	1158
		1160	**[Line Speed Pct]** Line speed.	Default: Min/Max: Units:	Read Only 0.00 / 150.00 %	
		1161	**[Diam Calc Dis]** Enables/Disables the diameter calculation (see also Par 1155 [Line Spd Thresh]). The last calculated diameter value is saved if this parameter is changed to 0 "Off" while the diameter is being calculated.	Default: Options:	1 = "On" 0 = "Off" 1 = "On"	1155
		1162	**[Diameter Filter]** Diameter calculation filter.	Default: Min/Max: Units:	100 0 / 5000 ms	
		1163	**[Base Omega]** Winder speed at the maximum line speed and minimum diameter of the winder/unwinder (motor shaft side).	Default: Min/Max: Units:	1500 0 / 8191 RPM	
		1164	**[Diam Preset 0]** First preset starting diameter. The value of this parameter must be set between the value of Pars 799 [Minimum Diameter] and 1153 [Max Diameter].	Default: Min/Max: Units:	1.00 0.00 / 32.00 m	799, 1153
		1165	**[Diam Preset 1]** Second preset starting diameter. The value of this parameter must be set between the value of Pars 799 [Minimum Diameter] and 1153 [Max Diameter].	Default: Min/Max: Units:	1.00 0.00 / 32.00 m	799, 1153

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
APPLICATIONS	Diameter Calc	1166	**[Diam Preset 2]** Third preset starting diameter. The value of this parameter must be set between the value of Pars 799 [Minimum Diameter] and 1153 [Max Diameter].	Default: Min/Max: Units:	1.00 0.00 / 32.00 m	799, 1153
		1167	**[Diam Preset 3]** Fourth preset starting diameter. The value of this parameter must be set between the value of Pars 799 [Minimum Diameter] and 1153 [Max Diameter]. This parameter can be assigned to an analog input. If an analog input is used, +10V corresponds to the value of [Max Diameter] and the voltage corresponding to the minimum diameter = 10 x ([Minimum Diameter] / [Max Diameter]).	Default: Min/Max: Units:	1.00 0.00 / 32.00 m	799, 1153
		1168	**[Diam Preset Sel]** Selects the starting diameter for the Diameter Calculation function. • 0 = Par 1164 [Diam Preset 0] • 1 = Par 1165 [Diam Preset 1] • 2 = Par 1166 [Diam Preset 2] • 3 = Par 1167 [Diam Preset 3] This parameter can also be set via two digital inputs programmed as 57 “Diam Preset0” and 58 “Diam Preset1”; the selection in this case is carried out with binary logic. **“Diam Preset1” / “Diam Preset0” / Selection** 0 / 0 / Par 1164 [Diam Preset 0] 0 / 1 / Par 1165 [Diam Preset 1] 1 / 0 / Par 1166 [Diam Preset 2] 1 / 1 / Par 1167 [Diam Preset 3]	Default: Min/Max:	0 0 / 3	1164, 1165, 1166, 1167
		1205	**[Diam Inc Dec En]** This parameter It is used to improve system stability for winder/ unwinder applications. If this parameter is enabled and if applied to a winder, the calculated diameter can never decrease; if applied to an unwinder, the calculated diameter can never increase.	Default: Options:	1 = “Enabled” 0 = “Disabled” 1 = “Enabled”	
		1206	**[Diam init filter]** Initial filter on the diameter calculation.	Default: Min/Max: Units:	100 0 / 5000 ms	
		1207	**[Diam stdy delay]** The amount of time during which the value of Par 1206 [Diam init filter] is kept active after the value defined in Par 1155 [Line Spd Thresh] has been overcome.	Default: Min/Max: Units:	0 0 / 60000 ms	1155, 1206
	Winder Functions	1171	**[Variable J Comp]** Torque compensation due to the wound material as a percentage of the drive rated current.	Default: Min/Max: Units:	0.00 0.00 / 199.99 %	
		1172	**[Constant J Comp]** Compensation of the fixed section (motor, reducer, pin) as a percentage of the drive rated current.	Default: Min/Max: Units:	1.00 – / +100.00 %	
		1173	**[Materl Width Pct]** Width of the wound material as a percentage of the maximum width.	Default: Min/Max: Units:	100.00 0.00 / 100.00 %	
		1174	**[Static Friction]** Compensation for static friction as a percentage of the drive rated current.	Default: Min/Max: Units:	0.00 0.00 / 199.99 %	
		1175	**[Dynamic Friction]** Compensation for dynamic friction as a percentage of the drive rated current.	Default: Min/Max: Units:	0.00 0.00 / 199.99 %	

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
APPLICATIONS	Winder Functions	1176	**[Taper Enable]** Enables/Disables the Taper function.	Default: Options:	0 = 0 = 1 =	"Disabled" "Disabled" "Enabled"	
		1177	**[Initial Diameter]** Diameter that starts the taper tension reduction.	Default: Min/Max: Units:	0.10 0.00 / 32.00 m		
		1178	**[Final Diameter]** Diameter that ends the taper tension reduction.	Default: Min/Max: Units:	1.00 0.00 / 32.00 m		
		1179	**[Tension Reduct]** Taper tension reduction as a percentage of Par 1180 [Tension Ref].	Default: Min/Max: Units:	0.00 0.00 / 199.99 %		1180
		1180	**[Tension Ref]** Tension reference. Note: This parameter can be assigned to an analog output.	Default: Min/Max: Units:	0.00 0.00 / 199.99 %		
		1181	**[Tension Scale]** Scale factor of the torque current. This parameter is used when the value of the maximum winding torque must be limited or when a closed loop control is used in order to adjust the torque current value to the real tension on the material measured by the load cell.	Default: Min/Max: Units:	100 0 / 200 %		
		1182	**[Time AccDec Min]** The amount of time corresponding to the lower acceleration, deceleration and fast deceleration time.	Default: Min/Max: Units:	9.00 0.15 / 300 s		
		1183	**[Int Acc Calc En]** Enables/Disables the calculation for coil acceleration. • "Enabled" = This function carries out the calculation of the angular acceleration inside the drive. In this case it is necessary to set just the value of Par 1182 [Time AccDec Min]. • "Disabled" = It is necessary to set Pars 1184 [Line Accel Pct], 1185 [Line Decel Pct], 1186 [Line FastStp Pct] and 1182 [Time AccDec Min] and to supply the corresponding status indication to the digital inputs.	Default: Options:	1 = 0 = 1 =	"Enabled" "Disabled" "Enabled"	1182, 1184, 1185, 1186
		1184	**[Line Accel Pct]** Acceleration time as a percentage Par 1182 of [Time AccDec Min].	Default: Min/Max: Units:	100.00 0.00 / 100.00 %		1182
		1185	**[Line Decel Pct]** Deceleration time as a percentage of Par 1182 [Time AccDec Min].	Default: Min/Max: Units:	100.00 0.00 / 100.00 %		1182
		1186	**[Line FastStp Pct]** Fast deceleration time as a percentage of Par 1182 [Time AccDec Min].	Default: Min/Max: Units:	100.00 0.00 / 100.00 %		1182
		1187	**[Winder Type]** Winder/unwinder selection. If the selection is carried out via a digital input: 0V = "Winder" , +24V = "Unwinder".	Default: Options:	0 = 0 = 1 =	"Winder" "Winder" "Unwinder"	
		1193	**[Torq Current Pct]** Displays the amount of torque current required. Note: This parameter can be assigned to an analog output.	Default: Min/Max: Units:	Read Only 0.00 / 200.00 %		
		1194	**[Act Ten Ref Pct]** Displays the percentage of tension reference less the Taper percentage set via Par 1179 [Tension Reduct]. If the Taper function is not enabled, it corresponds to the value displayed in Par 1180 [Tension Ref].	Default: Min/Max: Units:	Read Only 0.00 / 199.99 %		1179, 1180
		1195	**[Speed Match]** Coil "launching" phase command for automatic switching. Note: This parameter can be assigned to a digital input.	Default: Options:	0 = 0 = 1 =	"Off" "Off" "On"	

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
APPLICATIONS	Winder Functions	1196	**[Spd Match Acc]** Motor acceleration time during the launching phase.	Default: Min/Max: Units:	83.88 0.30 / 300.00 s	
		1197	**[Spd Match Dec]** Motor deceleration time. If the motor decelerates during the launching phase a stop command is issued.	Default: Min/Max: Units:	83.88 0.30 / 300.00 s	
		1198	**[Offs Accel Time]** Ramp time for the initial phase when the machine is stopped. It refers to Par 45 [Max Ref Speed].	Default: Min/Max: Units:	83.88 0.30 / 300.00 s	
		1199	**[W Offset]** Speed reference offset for the initial phase of the winder/unwinder when the line is stopped.	Default: Min/Max: Units:	0 0 / 1000 RPM	
		1200	**[Spd Match Gain]** Speed reference gain during the launching phase. 100% corresponds to a peripheral speed equal to the line speed.	Default: Min/Max: Units:	100 0 / 150 %	
		1201	**[Winder Side]** Selection of the winding/unwinding side. • "0" = Up • "1" = Down Note: This parameter can be assigned to a digital input.	Default: Min/Max:	0 0 / 1	
		1202	**[W Gain]** Sets the speed reference gain used to saturate the speed loop. This parameter is a percentage of the increasing/decreasing value of the angular speed reference.	Default: Min/Max: Units:	0 0 / 100 %	
		1203	**[Spd Match Compl]** Indicates a completed launching ramp. If this parameter is assigned to a programmed digital output, it can be used to indicate that the coil can be changed. • "1" = Launching ramp completed • "0" = Launching ramp not completed	Default: Min/Max:	Read Only 0 / 32767	
		1204	**[Line Spd Source]** Number of the sampling parameter for the line speed.	Default: Min/Max:	0 0 / 65535	
		1208	**[Close Loop Comp]** Active compensation status (output of the PID regulator).	Default: Min/Max:	Read Only – / +32767	
		1209	**[Torque Winder En]** Enables/disables the center winder function.	Default: Options:	0 = "Disabled" 0 = "Disabled" 1 = "Enabled"	
		1210	**[W Target]** Parameter number of the speed reference address.	Default: Min/Max:	0 0 / 65535	
		1213	**[Actual Comp]** Active compensation status (sums up the static, dynamic and inertial frictions) as a percentage of the drive rated current. Note: This parameter can be assigned to an analog output.	Default: Min/Max: Units:	Read Only –/+200 %	
		1214	**[Closed Loop En]** Enables/Disables closed loop tension control (used with a load cell).	Default: Options:	0 = "Disabled" 0 = "Disabled" 1 = "Enabled"	
		1215	**[Speed Demand En]** Enables/Disables the speed reference calculation for the Torque Winder application.	Default: Options:	0 = "Disabled" 0 = "Disabled" 1 = "Enabled"	
		1216	**[Spd match torque]** Sets the torque current during the launching and change phase.	Default: Min/Max: Units:	100 0 / 200 %	

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
APPLICATIONS	Winder Functions	1217	**[W Reference]** Angular speed reference. Note: This parameter can be assigned to an analog output; 10V = 100% of Par 45 [Max Ref Speed].	Default: Min/Max: Units:	Read Only –/+8192 RPM		1160
		1255	**[Jog TW Speed]** Torque Winder jog reference. The parameter is entered as a percentage of Par 1160 [Line Speed Pct].	Default: Min/Max: Units:	0 0 / 100 %		1160
		1256	**[Jog TW Enable]** Enables/Disables the Torque Winder jog function. Note: This parameter can be assigned to a digital input.	Default: Options:	0 = 0 = 1 =	"Disabled" "Disabled" "Enabled"	
		1284	**[Ref Spd Source]** Number of the line speed reference sampling parameter (used for inertia compensation and line speed reference).	Default: Min/Max:	0 0 / 65535		
		1285	**[Ref Speed Gain]** Gain value for the line speed reference. The value of this parameter depends on the value of Par 1284 [Ref Spd Source]. The value of [Ref Speed Gain] is used to obtain a line speed reference = 100% at its maximum value.	Default: Min/Max:	0 0 / 32767		1284
		1286	**[Ref Line Speed]** Line speed percentage.	Default: Min/Max: Units:	Read Only 0.00 / 150.00 %		
		1287	**[Static F Zero]** Enables/Disables friction compensation. • "Enabled" = The fiction compensation value is added to all speed values. • "Disabled" = The static friction compensation value is added to Par 1286 [Ref Line Speed] = 1.5%.	Default: Options:	0 = 0 = 1 =	"Disabled" "Disabled" "Enabled"	1286

Utility File

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
UTILITY	Reference Config	209	**[Save HIM Ref]** Enables a feature to save the present reference value issued by the HIM to drive memory when a power loss occurs. The value is restored to the HIM at power up. Bit 0 - "At Pwr Down" 0 = Do not save, 1 = Save at power down				
		210	**[Man Ref Preload]** Enables/disables a feature to automatically load the present "Auto" frequency reference value into the HIM when "Manual" is selected. Allows smooth speed transition from "Auto" to "Manual."	Default: Options:	1 = 0 = 1 =	"Enabled" "Disabled" "Enabled"	
		249	**[Save MOP Ref]** Enables/Disables the feature that saves the present MOP frequency reference at power down or at stop. Note: This parameter can be assigned to a digital input. • Bit 0 "At Pwr Down" - When set to "0" = Do not save, "1" = Save • Bit 1 "At Stop" - When set to "0" = Do not save, "1" = Save				
		1322	**[Direction Mode]** Selects the method that will be used for changing direction. • "Unipolar" - Drive Logic determines the direction. • "Bipolar" - The sign of the reference determines the direction. • "Rev Disable" - Forward direction only (not changeable).	Default: Options:	0 = 0 = 1 = 2 =	"Unipolar" "Unipolar" "Bipolar" "Rev Disable"	
		1375	**[MOP Select]** Selects the destination of the MOP signal.	Default: Options:	0 = 0 = 1 = 2 = 3 = 4 =	"Off" "Off" "Speed Ref A" "Speed Ref B" "Trim Speed" "TB Man Ref"	
	Drive Memory	211	**[Param Access Lvl]** Selects the parameter display level. • "Basic" = Reduced parameter set. • "Advanced" = Full parameter set.	Default: Options:	0 = 0 = 1 =	"Basic" "Basic" "Advanced"	
		258	**[Reset Defaults]** Setting this parameter to 1 "Factory" will load the default settings in the drive firmware.	Default: Options:	0 = 0 = 1 =	"Ready" "Ready" "Factory"	

209 [Save HIM Ref] — Bit values

	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	At Pwr Down
Default	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

249 [Save MOP Ref] — Bit values

	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	At Stop	At Pwr Down
Default	x	x	x	x	x	x	x	x	x	x	x	x	x	x	0	0
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
UTILITY	Diagnostics	346	**[Torque Positive]** Indicates whether the drive is operating with a positive torque reference. • 1 “Active” = The drive is operating with a positive torque reference. The motor is accelerating in the forward direction or decelerating in the negative direction and Par 20 [Ramp Delay] has timed out. • 0 “Not Active” = The drive is not operating with a positive torque reference. Note: This parameter can be assigned to a digital output.	Default: Min/Max:	Read Only 0 / 1	20
		347	**[Torque Negative]** Indicates whether the drive is operating with a negative torque reference. • 1 “Active” = The drive is operating with negative torque reference. The motor is accelerating in the reverse direction or decelerating in the forward direction and Par 20 [Ramp Delay] has timed out. • 0 “Not Active” = The drive is not operating with negative torque reference. Note: This parameter can be assigned to a digital output and is used for four quadrant drives only.	Default: Min/Max:	Read Only 0 / 1	20
		349	**[CurrLimit Active]** Indicates whether or not the drive is working within the set current limits. • 1 “Active” = The drive is currently in a current limited state. • 0 “Not Active” =The drive is not in a current limited state. Note: This parameter is assigned to digital output 4 (Par 148 [Digital Out4 Sel]) by default.	Default: Min/Max:	Read Only 0 / 1	
		372	**[Spd Limit Active]** Indicates whether the current speed reference value is limited by the defined minimum and maximum limit values. • 1 “Active” = The reference value is currently limited since the value entered is out of range of the limit values defined. • 0 “Not Active” = The reference value is within the defined limit values. Note: This parameter can be assigned to a digital output.	Default: Min/Max:	Read Only 0 / 1	

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values	Related
UTILITY	Diagnostics	381	**[Drive Status 1]** Present operating condition of the drive. Bit 0 “Ready” - When set (= “1”), the drive is ready Bit 1 “Active” - When set, the drive is active Bit 2 “Command Dir” - The direction of commanded rotation, 0 = Reverse, 1 = Forward Bit 3 “Actual Dir” - The actual direction of the motor, 0 = Reverse, 1 = Forward Bit 4 “Accelerating” - When set, the drive is accelerating Bit 5 “Decelerating” - When set , the drive is decelerating Bit 6 “Alarm” - When set, the drive is in an alarm state Bit 7 “Fault” - When set, the drive is faulted Bit 8 “At Speed” -When set, the drive is at the commanded speed Bit 9 - 11 “Local ID 0-2” (1) Bit 12-15 “Spd Ref ID 0-3” (2)	Read Only	

	Spd Ref ID 3 (2)	Spd Ref ID 2 (2)	Spd Ref ID 1 (2)	Spd Ref ID 0 (2)	Local ID 2 (1)	Local ID 1 (1)	Local ID 0 (1)	At Speed	Faulted	Alarm	Decelerating	Accelerating	Actual Dir	Command Dir	Active	Ready
Default	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

(2) Bits				
15	**14**	**13**	**12**	**Description**
0	0	0	0	Spd Ref A Auto
0	0	0	1	Spd Ref B Auto
0	0	1	0	Preset Spd 2 Auto
0	0	1	1	Preset Spd 3 Auto
0	1	0	0	Preset Spd 4 Auto
0	1	0	1	Preset Spd 5 Auto
0	1	1	0	Preset Spd 6 Auto
0	1	1	1	Preset Spd 7 Auto
1	0	0	0	TB Manual
1	0	0	1	DPI Port 1 Manual
1	0	1	0	DPI Port 2 Manual
1	0	1	1	DPI Port 3 Manual
1	1	0	0	DPI Port 4 Manual
1	1	0	1	DPI Port 5 Manual
1	1	1	0	DPI Port 6 Manual
1	1	1	1	Jog Ref

(1) Bits			
11	**10**	**9**	**Description**
0	0	0	Port 0 (TB)
0	0	1	DPI Port 1
0	1	0	DPI Port 2
0	1	1	DPI Port 3
1	0	0	DPI Port 4
1	0	1	DPI Port 5
1	1	0	DPI Port 6
1	1	1	No Local Control

	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Auto Tuning	Curr Limit	Stopping	Jogging	Running	Active	Ready
Default	x	x	x	x	x	x	x	x	0	0	0	0	0	0	0	1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

UTILITY	Diagnostics	382	**[Drive Status 2]** Present operating condition of the drive. Bit 0 “Ready” - When set (= “1”), the drive is ready Bit 1 “Active” - When set, the drive is active Bit 2 “Running” - When set, the drive is running Bit 3 “Jogging” - When set, the drive is being jogged Bit 4 “Stopping” - When set, the drive is stopping Bit 6 “Auto Tuning” - When set, the drive is auto tuning	Read Only	

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
UTILITY	Diagnostics	393	**[Speed Threshold]** Indicates if the drive is above or below the threshold speed specified in parameters 101 [Speed Thresh Pos] (clockwise rotation) and 102 [Speed Thresh Neg] (counter-clockwise rotation). • "0 Above Thresh" = The speed has exceeded the set speed threshold. • "1 Below Thresh" = The speed has not exceeded the set speed threshold. Note: This parameter can be assigned to a digital output.	Default: Min/Max:	Read Only 0 / 1	101, 102, 103
		394	**[At Speed]** Indicates whether or not the current speed of the drive corresponds to the speed reference (specified in Par 118 [Speed Reg In]) before the speed regulator and the ramp reference (if enabled) are applied. The speed above and below the speed reference at which [At Speed] will indicate "1 Equal" is set in Par 104 [At Speed Error]. • "0 Not Equal" - The drive is not working at the set speed reference. • "1 Equal" - The drive is working at the set speed reference. Note: This parameter can be assigned to a digital output. It also corresponds to the "At Speed" indication on the Status Line of the HIM.	Default: Min/Max:	Read Only 0 / 1	104, 105
		395	**[At Zero Speed]** Indicates whether or not the actual speed of the motor is below the zero speed threshold as specified in Par 107 [Speed Zero Level]. • "0 Equal" - The actual speed is below the value of Par 107 [Speed Zero Level] and Par 108 [Speed Zero Delay] has timed out. • "1 Not Equal" - The actual speed is above the value of Par 107 [Speed Zero Level]. Note: This parameter can be assigned to a digital output.	Default: Min/Max:	Read Only 0 / 1	107, 108
		396	**[MOP Inc Active]** Indicates whether or not the drive is accelerating using the preselected ramp. • 0 "No Accel" = the drive is not accelerating using a preselected ramp • 1 "Accel" = the drive is accelerating using a preselected ramp	Default: Min/Max:	Read Only 0 / 1	
		397	**[MOP Dec Active]** Indicates whether the drive is decelerating using the preselected ramp. • 0 "No Decel" = The drive is not decelerating using a preselected ramp • 1 "Decel" = The drive is decelerating using a preselected ramp	Default: Min/Max:	Read Only 0 / 1	
		400	**[Spd Select 0]** Indicates the state of the assigned digital input, [Digital Inx Sel], set to 17 "Speed Sel 1". Refer to Option Definitions for [Digital Inx Sel] on page 3-65 for instructions on how to set digital input speed selects to different speed references. • "0" = Digital input [Digital Inx Sel] set to 17 "Speed Sel 1" not asserted • "1" = Digital input [Digital Inx Sel] set to 17 "Speed Sel 1" asserted Note: By default, the state of this parameter is determined by digital input 5.	Default: Min/Max:	Read Only 0 / 1	401, 402

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
UTILITY	Diagnostics	401	**[Spd Select 1]** Indicates the state of the assigned digital input, [Digital Inx Sel], set to 18 “Speed Sel 2”. Refer to Option Definitions for [Digital Inx Sel] on page 3-65 for instructions on how to set digital input speed selects to different speed references. • “0” = Digital input [Digital Inx Sel] set to 18 “Speed Sel 2” not asserted • “1” = Digital input [Digital Inx Sel] set to 18 “Speed Sel 2” asserted Note: By default, the state of this parameter is determined by digital input 6.	Default: Min/Max:	Read Only 0 / 1	400, 402
		402	**[Spd Select 2]** Indicates the state of the assigned digital input, [Digital Inx Sel], set to 19 “Speed Sel 3”. Refer to Option Definitions for [Digital Inx Sel] on page 3-65 for instructions on how to set digital input speed selects to different speed references. • “0” = Digital input [Digital Inx Sel] set to 19 “Speed Sel 3” not asserted • “1” = Digital input [Digital Inx Sel] set to 19 “Speed Sel 3” asserted Note: By default, the state of this parameter is determined by digital input 7.	Default: Min/Max:	Read Only 0 / 1	400, 401
		403	**[Ramp Select 0]** Indicates the state of the assigned digital input, [Digital Inx Sel], set to 25 “Acc2 & Dec2” or 26 “Accel 2”. • “0” = Accel 1 ramp rate is selected • “1” = Accel 2 ramp rate is selected Note: This parameter can be assigned to indicate the state of a digital input.	Default: Min/Max:	Read Only 0 / 1	404
		404	**[Ramp Select 1]** Indicates the state of the assigned digital input, [Digital Inx Sel], set to 25 “Acc2 & Dec2” or 27 “Decel 2”. • “0” = Decel 1 ramp rate is selected • “1” = Decel 2 ramp rate is selected Note: This parameter can be assigned to indicate the state of a digital input.	Default: Min/Max:	Read Only 0 / 1	403
		651	**[Encoder State]** Indicates the connection status of the digital encoder or tachometer. • “0” = Fault • ‘1” = OK This parameter can be assigned to a digital output.	Default: Min/Max:	Read Only 0 / 1	
		1188	**[Accel Status]** Indicates the drive acceleration status. • “0” = Off - Drive not accelerating • “1” = “On” - Drive accelerating Note: This parameter can be assigned to a digital output.	Default: Min/Max:	Read Only 0 / 1	
		1189	**[Decel Status]** Indicates the drive deceleration status. • “0” = “Off” - Drive not decelerating • “1” = “On” - Drive decelerating Note: This parameter can be assigned to a digital output.	Default: Min/Max:	Read Only 0 / 1	
		1190	**[Fast Stop Status]** Indicates the drive fast stop status. • “0” = “Off” - Drive is not fast stopping • “1” = “On” - Drive is fast stopping	Default: Min/Max:	Read Only 0 / 1	

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
UTILITY	Diagnostics	1328	**[Drive Logic Rslt]** The final logic command resulting from the combination of all DPI and discrete inputs. This parameter has the same structure as the product specific logic command received via DPI and is used in peer to peer communications. For each bit, 1=Condition true and 0=Condition false. Bit 0 “Stop” - Stop command Bit 1 “Start” - Start command Bit 2 “Jog” - Jog command Bit 3 “Clear Faults” - Clear faults command Bit 4 “Forward” - Forward direction command Bit 5 “Reverse” - Reverse direction command Bit 6 “Local” - Local control command” Bit 7 “MOP Inc” - MOP Increment command Bit 8 “Accel 1” - Acceleration Rate 1 command Bit 9 “Accel 2” - Acceleration Rate 2 command Bit 10 “Decel 1” - Deceleration Rate 1 command Bit 11 “Decel 2” - Deceleration Rate 2 command Bit 12-14 “Spd Ref ID 0-2” - Speed reference source(1) Bit 15 “MOP Dec” - MOP Decrement command			

	MOP Dec	Spd Ref ID 2	Spd Ref ID 1	Spd Ref ID 0	Decel 2	Decel 1	Accel 2	Accel 1	MOP Inc	Local	Reverse	Forward	Clear Faults	Jog	Start	Stop
Default	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

(1) **Bits**			
14	**13**	**12**	**Description**
0	0	0	No Command - Manual Mode
0	0	1	Spd Ref A Auto
0	1	0	Spd Ref B Auto
0	1	1	Preset Spd 3 Auto
1	0	0	Preset Spd 4 Auto
1	0	1	Preset Spd 5 Auto
1	1	0	Preset Spd 6 Auto
1	1	1	Preset Spd 7 Auto

	1381	**[TestPoint Sel]** Selects the function whose value is displayed in [TestPoint Val]. These are internal values that are not accessible through any other parameters. Typically, these are internal drive variables and registers. Refer to Testpoint Codes and Functions on page 4-14 for more information.	Default: Min/Max:	566 566 / 574	
	1382	**[TestPoint Data]** The present value of the function selected in Par 1381 [Testpoint Sel].	Default: Min/Max:	Read Only -2^{31} / 2^{31} - 1	
	1383	**[TaskLoad 32 ms]** The load percentage of the 32 ms task in the firmware.	Default: Min/Max:	Read Only 0.00 / 100.00	
	1384	**[TaskLoad 1 ms]** The load percentage of the 1 ms task in the firmware.	Default: Min/Max:	Read Only 0.00 / 100.00	
	1385	**[TaskLoad 2 ms]** The load percentage of the 2 ms task in the firmware.	Default: Min/Max:	Read Only 0.00 / 100.00	
	1386	**[TaskLoad 8 ms]** The load percentage of the 8 ms task in the firmware.	Default: Min/Max:	Read Only 0.00 / 100.00	

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
UTILITY	Diagnostics	1402	**[Last Stop Source]** Displays the source that initiated the most recent stop sequence. This parameter will be set to 0 "Pwr Removed" (cleared) during the next start sequence.	Default: Options:	 0 = 1 - 5 = 6 = 7 = 8 = 9 = 10 = 11 = 12 = 13 =	Read Only "Pwr Removed" "DPI Port 1-5" "Reserved" "Digital In" "Fault" "Not Enabled" "Reserved" "Jog" "Selftune" "Reserved"	
		1403	**[Start Inhibits]** Displays the inputs currently preventing the drive from starting. For each bit, 1=Inhibit condition true and 0=Inhibit condition false.				

	Reserved	Reserved	DPI Port 5	DPI Port 4	DPI Port 3	DPI Port 2	DPI Port 1	Digital In	Reserved	Startup Actv	Reserved	Stop Asserted	Reserved	Enable	Type 2 Alarm	Fault
Default	x	x	x	0	0	0	0	0	x	0	0	1	x	0	0	0
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
	Faults	263	**[Clear Fault Que]** Allows you to clear the fault queue. Refer to Chapter 4 Troubleshooting on page 4-1 for information on clearing the fault queue.	Default: Options:	0 = 0 = 1 =	"Ready" "Ready" "Clr Flt Que"	
		1347	**[Fault Clear]** Allows you to reset drive faults and/or clear the fault queue.	Default: Options:	0 = 0 = 1 = 2 =	"Ready" "Ready" "Clear Faults" "Clr Flt Que"	
		1348	**[Fault Clr Mode]** Enables/Disables a fault reset (clear faults) attempt from any source. This does not apply to fault codes which are cleared indirectly via other actions.	Default: Options:	1 = 0 = 1 =	"Enabled" "Disabled" "Enabled"	
		1349	**[Status1 at Fault]** Captures and displays Par 381 [Drive Status 1] bit pattern at the time of the last fault. 0=Condition False, 1=Condition True.				381

	Spd Ref ID 3	Spd Ref ID 2	Spd Ref ID 1	Spd Ref ID 0	Local ID 2	Local ID 1	Local ID 0	At Speed	Faulted	Alarm	Decelerating	Accelerating	Actual Dir	Command Dir	Active	Ready
Default	0	0	0	0	1	1	1	0	1	0	0	0	1	1	0	0
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
		1350	**[Status2 at Fault]** Captures and displays Par 382 [Drive Status 2] bit pattern at the time of the last fault. 0=Condition False, 1=Condition True.				382

	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Auto Tuning	Curr Limit	Stopping	Jogging	Running	Active	Ready
Default	x	x	x	x	x	x	x	x	x	0	0	0	1	1	0	0
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
UTILITY	Faults	1351 1352 1353 1354 1355 1356 1357 1358 1359 1360	**[Fault 1 Code]** **[Fault 2 Code]** **[Fault 3 Code]** **[Fault 4 Code]** **[Fault 5 Code]** **[Fault 6 Code]** **[Fault 7 Code]** **[Fault 8 Code]** **[Fault 9 Code]** **[Fault 10 Code]** A code that represents the fault that tripped the drive. The codes will appear in these parameters in the order they occur (i.e., [Fault 1 Code] = the most recent fault). Refer to Fault Descriptions on page 4-4 for a list of possible codes.	Default: Min/Max:	Read Only 0 / 32768		
		1361 1362 1363 1364 1365 1366 1367 1368 1369 1370	**[Fault 1 Time]** **[Fault 2 Time]** **[Fault 3 Time]** **[Fault 4 Time]** **[Fault 5 Time]** **[Fault 6 Time]** **[Fault 7 Time]** **[Fault 8 Time]** **[Fault 9 Time]** **[Fault 10 Time]** The time between initial drive power up and the occurrence of the associated trip fault.	Default: Min/Max: Units:	Read Only 0.000 / 134000000.000 hr.		
		1371	**[Fault Arm Amps]** Captures and displays the armature current (as a percentage of rated current) at the time of the last fault.	Default: Min/Max: Units:	Read Only –/+200 %		
		1372	**[Fault Speed]** Captures and displays the output speed (rpm) of the drive at the time of the last fault.	Default: Min/Max: Units:	Read Only – / +32766 RPM		
		1373	**[Fault Field Amps]** Captures and displays the field current (as a percentage of rated current) at the time of the last fault.	Default: Min/Max: Units:	Read Only 0.00 / 100.00 %		
		1374	**[Fault Voltage]** Captures and displays the armature voltage at the time of the last fault.	Default: Min/Max: Units:	Read Only - / + 999.00 Vdc		
	Alarms	203	**[OverVolt Flt Cfg]** Determines the response of the drive to an overvoltage condition (F5 “Arm Overvoltage”). Note: Refer to Chapter 4 for a list of alarm and fault descriptions.	Default: Options:	2 = 0 = 1 = 2 =	“Fault” “Ignore” “Alarm” “Fault”	
		354	**[Aux Inp Flt Cfg]** Determines the response of the drive to an external fault condition (F2 “Auxiliary Input”), i.e., no voltage at the digital input terminal assigned to [Digital Inx Sel] with a value of 14 “Aux Fault”. Note: Refer to Chapter 4 for a list of alarm and fault descriptions.	Default: Options:	2 = 1 = 2 = 3 = 4 = 5 =	“Fault” “Alarm” “Fault” “Quick Stop” “Normal Stop” “CurrLim Stop”	
		365	**[OverTemp Flt Cfg]** Determines the response of the drive to a motor over temperature condition (F16 “Motor Over Temp”). Note: Refer to Chapter 4 for a list of alarm and fault descriptions.	Default: Options:	2 = 0 = 1 = 2 = 3 = 4 = 5 =	“Fault” “Ignore” “Alarm” “Fault” “Quick Stop” “Normal Stop” “CurrLim Stop”	
		473	**[FldLoss Flt Cfg]** Determines the response of the drive to a field loss condition (F6 “Fld Current Loss”). If Par 497 [Field Reg Enable] is set to 0 “Disabled”, this parameter should be set to 0 “Ignore”. Note: Refer to Chapter 4 for a list of alarm and fault descriptions.	Default: Options:	2 = 0 = 1 = 2 =	“Fault” “Ignore” “Alarm” “Fault”	497

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
UTILITY	Alarms	478	**[Spd Loss Flt Cfg]** Determines the response of the drive to a speed feedback loss condition (F91 Encoder Loss). Note: Refer to Chapter 4 for a list of fault descriptions.	Default: Options:	2 = 1 = 2 =	"Fault" "Alarm" "Fault"	
		481	**[UnderVolt Thresh]** The AC input voltage level below which an undervoltage fault (F4 "AC Undervoltage") will be detected. Note: Refer to Chapter 4 for a list of fault descriptions.	Default: Min/Max: Units:	230 0 / 1000 Vac		
		584	**[OverCurrent Thr]** Value at which an overcurrent condition (F13 "Overcurrent") will be detected. Note: Refer to Chapter 4 for a list of fault descriptions.	Default: Min/Max: Units:	175 0 / 250 %		
		1380	**[Drive Alarm 1]** Alarm conditions that currently exist in the drive. For each bit, 1=Condition true and 0=Condition false. Bit 0 "DigInCflctA" - Digital input functions are in conflict. Bit 1 "DigInCflctB" - A digital Start input has been configured without a Stop input or other functions are in conflict. Bit 2 "DigInCflctC" - More than one physical input has been configured to the same input function. Bit 3 "BipolarCflct" - Parameter 1322 [Direction Mode] is set to "Bipolar" or "Reverse Dis" and one or more of the following digital input functions is configured: "Fwd/Reverse," "Run Forward," "Run Reverse," "Jog Forward" or "Jog Reverse." Bit 4 "AnalogCflct" - Analog input functions are in conflict. Bit 5 "CntactrCflct" - Contactor input functions are in conflict. Bit 6 "Encoder Cflc" - Indicates an encoder configuration conflict. Bit 7 "Overvoltage" - There is an overvoltage on the armature circuit. Bit 8 "Over Temp" - The motor has exceeded its temperature rating (as signaled by the thermistor connected to the drive terminals 78 and 79). Bit 9 "Aux Input" - An auxiliary input interlock is open or a voltage (15 - 30 V) or reference signal is missing for the digital input set to 14 "Aux Fault". Bit 10 "Field Loss" - The field current is too low. Bit 11 "Encoder Loss" - The drive is not receiving a speed feedback signal. Bit 12 "PwrUp Start" - Indicates that the drive is starting or has automatically resumed running at commanded speed after drive input power is restored. Note: Refer to Chapter 4 Troubleshooting on page 4-1 for information.				1322
	User Defined	50	**[UsrDsplyMult0]** Numerator in the calculation for user-defined, drive speed display units. Note: This parameter is not used.	Default: Min/Max:	1 1 / 1073741823		
		51	**[UsrDsplyDiv0]** Denominator in the calculation for user-defined, drive speed display units. Note: This parameter is not used.	Default: Min/Max:	1 1 / 1073741823		
		53	**[UsrValMult1]** Numerator in the calculation for scaling the user-defined, drive speed display units. Note: This parameter is not used.	Default: Min/Max:	1 1 / 32767		
		54	**[UsrValDiv1]** Denominator in the calculation for scaling the user-defined, drive speed display units. Note: This parameter is not used.	Default: Min/Max:	1 1 / 32767		

	Reserved	Reserved	Reserved	PwrUp Start	Encoder Loss	Field Loss	Aux Input	Over Temp	Overvoltage	Encoder Cflc	CntactrCflct	AnalogCflct	BipolarCflct	DigInCflctC	DigInCflctB	DigInCflctA
Default	x	x	x	x	x	0	0	0	0	0	0	0	0	0	0	0
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
UTILITY	User Defined	503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518	**[UserDefined0]** **[UserDefined1]** **[UserDefined2]** **[UserDefined3]** **[UserDefined4]** **[UserDefined5]** **[UserDefined6]** **[UserDefined7]** **[UserDefined8]** **[UserDefined9]** **[UserDefined10]** **[UserDefined11]** **[UserDefined12]** **[UserDefined13]** **[UserDefined14]** **[UserDefined15]** General use signed 16 bit variables used for data exchange. Note: Pars 503–506 can be assigned to analog inputs. The values of Pars 503, 504, and 507 - 509 can be assigned to an analog output.	Default: Min/Max:	0 –32768/+32767	
		519	**[UsrDefBitWrdA]** A bitmap of Pars 520 [UsrDefBitWrdA0] through 535 [UsrDefBitWrdA15]. With a parameter it is possible to read or write all of the bits inside a word. Example: [UsrDefBitWrdA0] 0 [UsrDefBitWrdA1] $1 = 2^1 = 2$ [UsrDefBitWrdA2] 0 [UsrDefBitWrdA3] 0 [UsrDefBitWrdA4] 0 [UsrDefBitWrdA5] $1 = 2^5 = 32$ [UsrDefBitWrdA6] $1 = 2^6 = 64$ [UsrDefBitWrdA7] 0 [UsrDefBitWrdA8] 0 [UsrDefBitWrdA9] 0 [UsrDefBitWrdA10] $1 = 2^{10} = 1024$ [UsrDefBitWrdA11] 0 [UsrDefBitWrdA12] $1 = 2^{12} = 4096$ [UsrDefBitWrdA13] 0 [UsrDefBitWrdA14] 0 [UsrDefBitWrdA15] 0 [UsrDefBitWrdA] = 2 + 32 + 64 + 1024 + 4096 = 5218 Note: This parameter can be assigned to a digital input or output. The bit number corresponds to the digital input/output number (e.g., digital input 3 uses [UsrDefBitWrdA3]). Relay Outputs 1 and 2 use bits 14 and 15, respectively.	Default: Min/Max:	0 0 / 65535	520 - 535

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
UTILITY	User Defined	520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535	**[UsrDefBitWrdA0]** **[UsrDefBitWrdA1]** **[UsrDefBitWrdA2]** **[UsrDefBitWrdA3]** **[UsrDefBitWrdA4]** **[UsrDefBitWrdA5]** **[UsrDefBitWrdA6]** **[UsrDefBitWrdA7]** **[UsrDefBitWrdA8]** **[UsrDefBitWrdA9]** **[UsrDefBitWrdA10]** **[UsrDefBitWrdA11]** **[UsrDefBitWrdA12]** **[UsrDefBitWrdA13]** **[UsrDefBitWrdA14]** **[UsrDefBitWrdA15]** Bit variables. The individual "User Defined" bits can be read or written to. It is possible to process a word with Par 519 [UsrDefBitWrdA] (see example). Note: You can read bits 0-7 of a digital input with Par 519 [UsrDefBitWrdA] and write all of the bits associated with [UsrDefBitWrdA] to a digital output.	Default: Min/Max:	0 0 / 1	519

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
UTILITY	User Defined	536	**[UsrDefBitWrdB]** A bitmap of Pars 537 [UsrDefBitWrdB0] through 552 [UsrDefBitWrdB15]. With a parameter it is possible to read or write all of the bits inside a word. Example: [UsrDefBitWrdB0] 0 [UsrDefBitWrdB1] $1 = 2^1 = 2$ [UsrDefBitWrdB2] 0 [UsrDefBitWrdB3] 0 [UsrDefBitWrdB4] 0 [UsrDefBitWrdB5] $1 = 2^5 = 32$ [UsrDefBitWrdB6] $1 = 2^6 = 64$ [UsrDefBitWrdB7] 0 [UsrDefBitWrdB8] 0 [UsrDefBitWrdB9] 0 [UsrDefBitWrdB10] $1 = 2^{10} = 1024$ [UsrDefBitWrdB11] 0 [UsrDefBitWrdB12] $1 = 2^{12} = 4096$ [UsrDefBitWrdB13] 0 [UsrDefBitWrdB14] 0 [UsrDefBitWrdB15] 0 [UsrDefBitWrdB] = 2 + 32 + 64 + 1024 + 4096 = 5218 Note: This parameter can be assigned to a digital input or output. The bit number corresponds to the digital input/output number (e.g., digital input 3 uses [UsrDefBitWrdA3]). Relay Outputs 1 and 2 use bits 14 and 15, respectively.	Default: Min/Max:	0 0 / 65535	537 - 552
		537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552	**[UsrDefBitWrdB0]** **[UsrDefBitWrdB1]** **[UsrDefBitWrdB2]** **[UsrDefBitWrdB3]** **[UsrDefBitWrdB4]** **[UsrDefBitWrdB5]** **[UsrDefBitWrdB6]** **[UsrDefBitWrdB7]** **[UsrDefBitWrdB8]** **[UsrDefBitWrdB9]** **[UsrDefBitWrdB10]** **[UsrDefBitWrdB11]** **[UsrDefBitWrdB12]** **[UsrDefBitWrdB13]** **[UsrDefBitWrdB14]** **[UsrDefBitWrdB15]** Bit variables. The individual “User Defined” bits can be read or written to. It is possible to process a word with Par 536 [UsrDefBitWrdB]. See the example in Par 536 [UsrDefBitWrdB]. Note: You can read bits 0-7 of a digital input with Par 536 [UsrDefBitWrdB] and write all of the bits associated with [UsrDefBitWrdB] to a digital output.	Default: Min/Max:	0 0 / 1	536

Communications File

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
COMMUNICATIONS	Comm Control	589	**[DPI Baud Rate]** Shows the data transfer rate for attached drive peripherals. “1” - 500 kbps	Default: Min/Max:	Read Only 1 / 1		
		590	**[DPI Port Sel]** Selects which DPI port reference value (unscaled) will appear in Par 1343 [DPI Port Value].	Default: Options:	1 1 = 2 = 3 = 4 = 5 =	“DPI Port 1” “DPI Port 1” “DPI Port 2” “DPI Port 3” “DPI Port 4” “DPI Port 5”	1343
		1321	**[DPI Fdbk Select]** Selects the feedback variable and DPI units displayed on the feedback line of the HIM. • 0 “Speed” = Speed feedback units are in RPM • 1 “Current” = Current feedback units are in %	Default: Options:	0 = 0 = 1 =	“Speed” “Speed” “Current”	
		1343	**[DPI Port Value]** Unscaled value of the DPI reference selected in Par 590 [DPI Port Sel].	Default: Min/Max:	Read Only –/+32767		590
	Masks & Owners	591	**[Logic Mask]** Determines which ports can control the drive when Par 1377 [Write Mask Act], bit 15 is set to “1.” If the bit for a port is set to “0,” the port will have no control functions except for stop. 0 = Control Masked, 1 = Control Permitted, x = Reserved.				
		592	**[Start Mask]** Controls which adapters can issue start commands.		See [Logic Mask]		
		593	**[Jog Mask]** Controls which adapters can issue jog commands.		See [Logic Mask]		
		594	**[Direction Mask]** Controls which adapters can issue forward/reverse direction commands.		See [Logic Mask]		
		595	**[Reference Mask]** Controls which adapters can select a manual reference.		See [Logic Mask]		
		596	**[Accel Mask]** Controls which adapters can select the acceleration ramp rates (Pars 660 [Accel Time 1] and 24 [Accel Time 2]) of the drive.		See [Logic Mask]		24, 660
		597	**[Fault Clr Mask]** Controls which adapters can clear a fault.		See [Logic Mask]		
		598	**[MOP Mask]** Controls which adapters can issue MOP commands to the drive.		See [Logic Mask]		

	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	DPI Port 5	DPI Port 4	DPI Port 3	DPI Port 2	DPI Port 1	Digital In
Default	x	x	x	x	x	x	x	x	x	x	1	1	1	1	1	1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values	Related
COMMUNICATIONS	Masks & Owners	599	**[Local Mask]** Controls which adapters are allowed to take exclusive control of drive logic commands (except stop). Exclusive "local" control can only be taken while the drive is stopped.	See [Logic Mask]	
		600	**[Stop Owner]** The adapters that are presently issuing a valid stop command. 0 = No Command, 1 = Issuing Command, x = Reserved.		
		601	**[Start Owner]** The adapters that are presently issuing a valid start command.	See [Stop Owner]	
		602	**[Jog Owner]** The adapters that are presently issuing a valid jog command.	See [Stop Owner]	
		603	**[Direction Owner]** The adapter that currently has exclusive control of direction changes.	See [Stop Owner]	
		604	**[Reference Owner]** The adapter that has the exclusive control of the command frequency source selection.	See [Stop Owner]	
		605	**[Accel Owner]** The adapter that has exclusive control of the acceleration ramp rate (Pars 660 [Accel Time 1] and 24 [Accel Time 2]) for the drive.	See [Stop Owner]	24, 660
		606	**[Fault Clr Owner]** Adapter that is presently clearing a fault.	See [Stop Owner]	
		607	**[MOP Owner]** Adapters that are currently issuing increases or decreases in MOP command frequency.	See [Stop Owner]	
		608	**[Local Owner]** Adapter that has requested exclusive control of all drive logic functions. If an adapter is in local lockout, all other functions (except stop) on all other adapters are locked out and non–functional. Local control can only be obtained when the drive is not running.	See [Stop Owner]	
		609	**[Decel Owner]** The adapter that has exclusive control of the deceleration ramp rate (Pars 662 [Decel Time 1] and 32 [Decel Time 2]) for the drive.	See [Stop Owner]	32, 662
		631	**[Decel Mask]** Controls which adapters can select the deceleration ramp rate (Pars 662 [Decel Time 1] and 32 [Decel Time 2]) of the drive.	See [Logic Mask]	32, 662

	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	DPI Port 5	DPI Port 4	DPI Port 3	DPI Port 2	DPI Port 1	Digital In
Default	x	x	x	x	x	x	x	x	x	x	0	0	0	0	0	0
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
COMMUNICATIONS	Datalinks	610 611	**[Data In A1] – Link A Word 1** **[Data In A2] – Link A Word 2** Parameter number whose value will be written from a communications device data table. The value will not be updated until the drive is stopped. Refer to your communications option manual for datalink information.	Default: Min/Max:	0 (0 = "Disabled") 0 / 1408	
		612 613	**[Data In B1] – Link B Word 1** **[Data In B2] – Link B Word 2**	See [Data In A1] – Link A Word 1.		
		614 615	**[Data In C1] – Link C Word 1** **[Data In C2] – Link C Word 2**	See [Data In A1] – Link A Word 1.		
		616 617	**[Data In D1] – Link D Word 1** **[Data In D2] – Link D Word 2**	See [Data In A1] – Link A Word 1.		
		618 619	**[Data Out A1] – Link A Word 1** **[Data Out A2] – Link A Word 2** Parameter number whose value will be written to a communications device data table.	Default: Min/Max:	0 (0 = "Disabled") 0 / 1408	
		620 621	**[Data Out B1] – Link B Word 1** **[Data Out B2] – Link B Word 2**	See [Data Out A1] – Link A Word 1.		
		622 623	**[Data Out C1] – Link C Word 1** **[Data Out C2] – Link C Word 2**	See [Data Out A1] – Link A Word 1.		
		624 625	**[Data Out D1] – Link D Word 1** **[Data Out D2] – Link D Word 2**	See [Data Out A1] – Link A Word 1.		
		1319	**[Data In Val Sel]** Selects the Datalink parameter register to display in Par 1320 [Data In Sel Data].	Default: Min/Max:	610 610 / 617	1320
		1320	**[Data In SelData]** Displays the value selected in Par 1319 [Data In Val Sel].	Default: Min/Max:	Read Only - / $+2^{31}$	1319
	Security	591	**[Logic Mask]** Determines which ports can control the drive when Par 1377 [Write Mask Act], bit 15 is set to "1." If the bit for a port is set to "0," the port will have no control functions except for stop. 0 = Control Masked, 1 = Control Permitted, x = Reserved.			
		1376	**[Logic Mask Act]** Indicates the status of the logic mask for the DPI ports. When bit 15 is set, network security is controlling the logic mask instead of Par 591 [Logic Mask]. 0 = Control Masked, 1 = Control Permitted, x = Reserved.		Read Only	591

	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	DPI Port 5	DPI Port 4	DPI Port 3	DPI Port 2	DPI Port 1	Digital In
Default	x	x	x	x	x	x	x	x	x	x	1	1	1	1	1	1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

	Advanced	Aux Port 14	Aux Port 13	Aux Port 12	Aux Port 11	Aux Port 10	Aux Port 9	Aux Port 8	Aux Port 7	Reserved	DPI Port 5	DPI Port 4	DPI Port 3	DPI Port 2	DPI Port 1	Digital In
Default	0	x	x	x	x	x	x	x	x	x	1	1	1	1	1	1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values	Related
COMMUNICATIONS	Security	1377	**[Write Mask Act]** The status of write access for the DPI ports. When bit 15 is set, network security is controlling the write mask instead of Par 1378 [Write Mask Cfg]. 0 = Read Only, 1 = Write Permitted, x = Reserved.	Read Only	1378
		1378	**[Write Mask Cfg]** Enables/Disables parameter write access for the DPI ports. Masking of the Port that is writing to this parameter is prohibited. 0 = Read Only, 1 = Write Permitted, x = Reserved.		1377
		1379	**[Port Mask Act]** Bits 0–5 indicate status for DPI port communication. Bit 15 indicates when security software is controlling the parameter. 0 = Not Active, 1 - Active, x - Reserved.	Read Only	

	Advanced	Aux Port 14	Aux Port 13	Aux Port 12	Aux Port 11	Aux Port 10	Aux Port 9	Aux Port 8	Aux Port 7	Reserved	DPI Port 5	DPI Port 4	DPI Port 3	DPI Port 2	DPI Port 1	Digital In
Default	0	x	x	x	x	x	x	x	x	x	1	1	1	1	1	0
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

	Reserved	Aux Port 14	Aux Port 13	Aux Port 12	Aux Port 11	Aux Port 10	Aux Port 9	Aux Port 8	Aux Port 7	Reserved	DPI Port 5	DPI Port 4	DPI Port 3	DPI Port 2	DPI Port 1	Digital In
Default	0	x	x	x	x	x	x	x	x	x	1	1	1	1	1	0
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

	Security	Aux Port 14	Aux Port 13	Aux Port 12	Aux Port 11	Aux Port 10	Aux Port 9	Aux Port 8	Aux Port 7	Reserved	DPI Port 5	DPI Port 4	DPI Port 3	DPI Port 2	DPI Port 1	Host
Default	0	x	x	x	x	x	x	x	x	x	1	1	1	1	1	1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Input / Output File

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
INPUT / OUTPUT	Analog Inputs	70 75 80	**[Anlg In1 Sel]** **[Anlg In2 Sel]** **[Anlg In3 Sel]** Selects the parameter to which a value will be written from the analog input. Options:	Default: Default: Default:	1 = 0 = 0 =	“Speed Ref A” “Off” “Off”	

0 =	“Off” (No signal)	9 =	“Neg Cur Lim” (Par 9)	18 =	“PI CentralV3” (Par 778)
1 =	“Speed Ref A” (Par 44)	10 =	“Jog Ref” (Par 266)	19 =	“PID Feedback” (Par 763)
2 =	“Speed Ref B” (Par 48)	11 =	“Adaptive Ref” (Par 183)	20 =	“Fld Cur Max” (Par 467)
3 =	“Trim Ramp” (Par 42)	12 =	“UserDefined0” (Par 503)	21 =	“OutVoltLevel” (Par 233)
4 =	“Trim Speed” (Par 43)	13 =	“UserDefined1” (Par 504)	22 =	“Speed Ratio” (Par 1017)
5 =	“Torque Ref” (Par 39)	14 =	“UserDefined2” (Par 505)	23 =	“Tension Red” (Par 1179)
6 =	“Trim Torque” (Par 40)	15 =	“UserDefined3” (Par 506)	24 =	“Tension Ref” (Par 1180)
7 =	“TB Man Ref” (Par 267)	16 =	“Load Comp” (Par 698)	25 =	“Diam Preset3” (Par 1167)
8 =	“Pos Cur Lim” (Par 8)	17 =	‘PID Setpt 0” (Par 760)		

INPUT / OUTPUT	Analog Inputs	71 76 81	**[Anlg In1 Config]** **[Anlg In2 Config]** **[Anlg In3 Config]** Selects the signal input (voltage or current) mode for the analog input. Configure switches S9, S10, and S11 on the Control board according to the input signal used. The inputs of the drive are factory set for voltage signals. Refer to DIP Switch and Jumper Settings on page 1-28 for information on switch configuration. • “+/–10V” = A maximum voltage of ±10V is connected to the analog input. If the signal is used as a reference value, a polarity reversal can be used to reverse the rotation direction of the drive (four quadrant only) when Par 1322 [Direction Mode] = 1 “Bipolar”. Two quadrant drives accept only positive references as the speed reference. Negative references are not accepted and the drive will run at zero speed. • “0-10V” = A maximum voltage of 10V is connected to the analog input. For reference values, only positive references are allowed. • “0 - 20mA” = A maximum current signal of 0 – 20 mA is connected to the analog input. The signal must be positive. • “4 to 20mA” = A current signal of 4 – 20 mA is connected to the analog input. The signal must be positive.	Default: Options:	0 = 0 = 1 = 2 = 3 =	“+/–10V” “+/–10V” “0-10V” “0 - 20mA” “4 to 20mA”	1322
INPUT / OUTPUT	Analog Inputs	72 77 82	**[Anlg In1 Scale]** **[Anlg In2 Scale]** **[Anlg In3 Scale]** Scales the value in the corresponding [Anlg Inx Sel] parameter.	Default: Min/Max:	1.00 –/+10.00		
INPUT / OUTPUT	Analog Inputs	73 78 83	**[Anlg1 Tune Scale]** **[Anlg2 Tune Scale]** **[Anlg3 Tune Scale]** Fine tuning of the analog input when the maximum signal does not correspond exactly to the rated value. Scales according to the following equation: [Anlg Inx Sel] – [Anlg Inx Offset] x [Anlg Inx Scale] x [Ainx Tune Scale]	Default: Min/Max:	1.00 0.10 / 10.00		

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
INPUT / OUTPUT	Analog Inputs	74 79 84	**[Anlg In1 Offset]** **[Anlg In2 Offset]** **[Anlg In3 Offset]** Offset value for the analog inputs. If the input has an offset or if the variable assigned to the input already has a value although there is no input signal present, this can be compensated for via the value in this parameter.	Default: Min/Max:	0 –32768/+32767		
		259 260 261	**[Anlg In1 Tune]** **[Anlg In2 Tune]** **[Anlg In3 Tune]** Automatic fine tuning of the analog inputs. If this command is given, parameter [Ainx Tune Scale] is automatically selected so that the input signal present, normally full scale, corresponds to the maximum variable value, such as the value of Par 45 [Max Ref Speed]. Two conditions are necessary for automatic fine tuning: • An input voltage greater than 1V or an input current greater than 2 mA. • Positive polarity. The value found is automatically set for the opposite direction for four quadrant drives. Note: The automatically calculated value can, if necessary, be modified manually via parameter [Ainx Tune Scale]. When using analog input tuning, Pars [Analog Inx Scale] are normally set to 1.0.	Default: Options:	0 = 0 = 1 =	"Ready" "Ready" "Tune"	
		295 296 297	**[Anlg In1 Target]** **[Anlg In2 Target]** **[Anlg In3 Target]** Enables sampling for the analog inputs.	Default: Options:	0 = 0 = 1 =	"Assigned" "Assigned" "Not Assigned"	
		792	**[Anlg In1 Filter]** Analog input 1 filter.	Default: Min/Max: Units:	0 0 / 1000 ms		
		1042	**[Anlg In1 Cmp]** Defines a reference point for the signal of analog input 1 around which a comparison range can be set (via Par 1043 [Anlg In1 Cmp Err]) and monitored. [Anlg In1 Cmp] = (comparison value) x 10000 / (max. reference value), where the values of "comparison" and "max. reference" are determined by the min/max of the related parameter selected via Par 70 [Anlg In1 Sel].	Default: Min/Max:	0 – / +10000		1043, 1044, 1045
		1043	**[Anlg In1 Cmp Err]** Defines a value above and below the value set in parameter 1042 [Anlg In1 Cmp] at which Par 1045 [Anlg In1 Cmp Eq] will transition. [Anlg In1 Cmp Err] = (tolerance value) x 10000 / (max. reference value), where the values of "tolerance" and "max. reference" are determined by the min/max of the parameter selected via Par 70 [Anlg In1 Sel].	Default: Min/Max:	0 0 / 10000		1042, 1044, 1045
		1044	**[Anlg In1 Cmp Dly]** Amount of time that must elapse, after the value in Par 1043 [Anlg In1 Cmp Err] has been reached, before Par 1045 [Anlg In1 Cmp Eq] transitions.	Default: Min/Max: Units:	0 0 / 65000 ms		1042, 1043, 1045
		1045	**[Anlg In1 Cmp Eq]** Provides an indication, after the amount of time specified in Par 1044 [Anlg In1 Cmp Dly] has elapsed, when the value set in parameter 1043 [Anlg In1 Cmp Err] has been reached. • "0" = The value of analog input 1 is above or below the value set in Par 1043 [Anlg In1 Cmp Err]. • "1" = The value of analog input 1 is within the range set in Par 1043 [Anlg In1 Cmp Err]. Note: This parameter can be assigned to a digital output.	Default: Min/Max:	Read Only 0 / 1		1042, 1043, 1044

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values		Related
INPUT / OUTPUT	Analog Inputs	1404	**[Analog In1 Value]** Value of the signal at analog input 1. Units based on the value set in Par 71 [Anlg In1 Config].	Default: Min/Max: Units:	Read Only -/+20.00 V or mA	71
		1405	**[Analog In2 Value]** Value of the signal at analog input 2. Units based on the value set in Par 76 [Anlg In2 Config].	Default: Min/Max: Units:	Read Only -/+20.00 V or mA	76
		1406	**[Analog In3 Value]** Value of the signal at analog input 3. Units based on the value set in Par 81 [Anlg In3 Config].	Default: Min/Max: Units:	Read Only -/+20.00 V or mA	81
	Analog Outputs	62 63 64 65	**[Anlg Out1 Scale]** **[Anlg Out2 Scale]** **[Anlg Out3 Scale]** **[Anlg Out4 Scale]** Scaling of the analog outputs.	Default: Min/Max:	1.00 –/ +10.00	
		66 67 68 69	**[Anlg Out1 Sel]** **[Anlg Out2 Sel]** **[Anlg Out3 Sel]** **[Anlg Out4 Sel]*** Selects the source of the value that drives the analog output. *This parameter is used to configure the analog output on the I/O Expansion circuit board. Options:	Default: Default: Default: Default:	12 = "Motor Speed" 13 = "Motor Curr" 18 = "Fld Current" 14 = "Motor Volts"	

0 =	"Off" (Not used)	12 =	"Motor Speed" (Par 121)(1)	24 =	"Field Ref" (Par 500)
1 =	"Spd Ref Out" (Par 385)	13 =	"Motor Curr" (Par 199)(2)	25 =	"PID Output" (Par 774)
2 =	"Trim Ramp" (Par 42)	14 =	"Motor Volts" (Par 233)	26 =	"Out Volt Lvl" (Par 921)
3 =	"Ramp In" (Par 110)	15 =	"Analog In 1" (Par 70)	27 =	"Fld Cur Max" (Par 467)
4 =	"Ramp Out" (Par 113)	16 =	"Analog In 2" (Par 75)	28 =	"Filtered Spd" (Par 924)(1)
5 =	"Spd Draw Out" (Par 1018)	17 =	"Analog In 3" (Par 80)	29 =	"Filtered Cur" (Par 928)(2)
6 =	"Trim Speed" (Par 43)	18 =	"Fld Current" (Par 234)	30 =	"Output Power" (Par 1052)(3)
7 =	"Spd Reg In" (Par 118)	19 =	"UserDefined0" (Par 503)	31 =	"Roll Diam" (Par 1154)(4)
8 =	"Spd Reg Out" (Par 236)	20 =	"UserDefined1" (Par 504)	32 =	"Tension Ref" (Par 1180)
9 =	"Torque Ref" (Par 39)	21 =	"UserDefined4" (Par 507)	33 =	"Torque Curr" (Par 1193)(2)
10 =	"Trim Torque" (Par 40)	22 =	"UserDefined5" (Par 508)	34 =	"Winder Ref" (Par 1217)(1)
11 =	"Torq Reg In" (Par 41)	23 =	"UserDefined6" (Par 509)	35 =	"Active Comp" (Par 1213)(2)

1 0-10V = 100% of Par 45 [Max Ref Speed].
2 ±10V = ± 200% of Par 179 [Nom Mtr Arm Amps].
3 ±10V = ± 200% of Par 179 [Nom Mtr Arm Amps] x Par 233 [Output Voltage].
4 As a percentage of Par 1153 [Max Diameter].

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
INPUT / OUTPUT	Digital Inputs	133 134 135 136 137 138 139 140 141 142 143 144	**[Digital In1 Sel]** **[Digital In2 Sel]** **[Digital In3 Sel]** **[Digital In4 Sel]** **[Digital In5 Sel]** **[Digital In6 Sel]** **[Digital In7 Sel]** **[Digital In8 Sel]** **[Digital In9 Sel]*** **[Digital In10 Sel]*** **[Digital In11 Sel]*** **[Digital In12 Sel]***	Default: Default: Default: Default: Default: Default: Default: Default: Default: Default: Default: Default:	2 = 3 = 11 = 1 = 17 = 18 = 19 = 31 = 0 = 0 = 0 = 0 =	"Stop/CF" "Start" "Jog" "Enable"(1) "Speed Sel 1" "Speed Sel 2" "Speed Sel 3" "Contactor" "Not Used" "Not Used" "Not Used" "Not Used"	

Selects the function driven by the digital input.
Refer to Option Definitions for [Digital Inx Sel] on page 3-65.
*These parameters are used to configure the digital inputs on the I/O Expansion circuit board.
Options:

0 =	"Not Used"	16 =	"Auto/Manual"	32 =	"MOP Reset"	48 =	"PI Cent vs0"
1 =	"Enable"(1) (2)	17 =	"Speed Sel 1"	33 =	"TorqueReduce"	49 =	"PI Cent vs1"
2 =	"Stop/CF" (2)	18 =	"Speed Sel 2"	34 =	"Field Reg En"	50 =	"Diam Calc"
3 =	"Start" (2)	19 =	"Speed Sel 3"	35 =	"Fld Weak En"	51 =	"Diam Reset"
4 =	"Fwd/Reverse" (2)	20 =	"PI Enable"	36 =	"Freeze Ramp"	52 =	"DiamCalc Dis"
5 =	"Run" (2)	21 =	"PI Hold"	37 =	"UsrDefinedA0"	53 =	"Torq Wind En"
6 =	"Run Forward" (2)	22 =	"PI Reset"	38 =	"UsrDefinedA1"	54 =	"Speed Match"
7 =	"Run Reverse" (2)	23 =	"PI Invert"	39 =	"UsrDefinedA2"	55 =	"Diam I/D En"
8 =	"Run Level" (2)	24 =	"Local"	40 =	"UsrDefinedA3"	56 =	"Wind/Unwind"
9 =	"RunFwd Level" (2)	25 =	"Acc2 & Dec2"	41 =	"UsrDefinedA4"	57 =	"Diam Preset0"
10 =	"RunRev Level" (2)	26 =	"Accel 2"	42 =	"UsrDefinedA5"	58 =	"Diam Preset1"
11 =	"Jog" (2)	27 =	"Decel 2"	43 =	"UsrDefinedA6"	59 =	"Taper Enable"
12 =	"Jog Forward" (2)	28 =	"MOP Inc"	44 =	"UsrDefinedA7"	60 =	"Spd DemandEn"
13 =	"Jog Reverse" (2)	29 =	"MOP Dec"	45 =	"Droop Enable"	61 =	"Winder Side"
14 =	"Aux Fault"	30 =	"Fast Stop"	46 =	"PD Enable"	62 =	"PI-PD Enable"
15 =	"Clear Faults"	31 =	"Contactor"	47 =	"PID SetptSel"	63 =	"Jog TW En"

1 A digital input (1-8 only) must be configured for "Enable".
2 This option is not available ("Reserved") for digital inputs 9 - 12.

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values	Related
INPUT / OUTPUT	Digital Inputs		**Option Definitions for [Digital Inx Sel]** Note: When assigning digital inputs to certain options that are associated with parameters, those parameter values may be overwritten by the state of the digital input.		

Option	Description
Enable(1)(2)	Asserting the input causes the motor to coast-to-stop without generating a fault.
Stop/CF(2)	Stops the drive if running or jogging or clears a fault if the drive is already stopped.
Start(2)	Issues a Start command, removal does not Stop the drive (3-wire control).
Fwd/Reverse(2)	Selects the operating direction of the drive.
Run(2)	Issues a Start command, removal causes the drive to Stop (2-wire control).
Run Forward(2)	Issues a Run command in the Forward direction.
Run Reverse(2)	Issues a Run command in the Reverse direction.
Run Level(2)	Level sensitive Run command (no off-to-on transition required).
RunFwd Level(2)	Run Level command in the Forward direction.
RunRev Level(2)	Run Level command in the Reverse direction.
Jog(2)	Starts the drive and runs at the speed in Par 266 [Jog Speed], removal causes the drive to Stop.
Jog Forward(2)	Issues a Jog command in the Forward direction.
Jog Reverse(2)	Issues a Jog command in the Reverse direction.
Aux Fault	Asserting causes an Auxiliary Input fault (F2).
Clear Faults	Issues a Clear Faults command.
Auto/Manual	Selects between Automatic and Manual speed reference values.
Speed Sel 1 - 3	Selects one of eight speed references. Bit enumerations: 000 = Par 44 [Speed Ref A], 001 = Par 48 [Speed Ref B], 010 = Par 155 [Preset Speed 2], 011 = Par 156 [Preset Speed 3], 100 = Par 157 [Preset Speed 4], 101 = Par 158 [Preset Speed 5], 110 = Par 159 [Preset Speed 6], 111 = Par 160 [Preset Speed 7]
PI Enable	Enables/disables the PI block of the PID regulator (Par 769 [Enable PI]).
PI Hold	Enables/disables a hold on the PI output.
PI Reset	Asserting causes a reset of the PI output.
PI Invert	Asserting causes an inversion of the PI output.
Local	Enables exclusive drive control via the I/O Terminal Block only.
Acc2 & Dec2	Switches between the Accel/Decel 1 and Accel/Decel 2 ramp rates.
Accel 2	Switches between the Accel 1 and Accel 2 ramp rates.
Decel 2	Switches between the Decel 1 and Decel 2 ramp rates.
MOP Inc	Asserting causes the MOP reference to increment at the rate set in Par 22 [MOP Accel Time].
MOP Dec	Asserting causes the MOP reference to decrement at the rate set in Par 30 [MOP Decel Time].
Fast Stop	Causes the drive to Stop at the rate set in Par 38 [Fast Stop Time].
Contactor	Indicates the status of the main contactor/DB contactor. Must be assigned and asserted in order to run drive when Par 1391 [ContactorControl] = “Contactor” or “Contactor+DB”.
MOP Reset	Asserting resets the MOP reference to zero.
TorqueReduce	Turns on /off Torque Reduction using the reduced current limit set in Par 13 [Torq Red CurLim].
Field Reg En	Enables/disables the field regulator (Par 497 [Field Reg Enable])
Fld Weak En	Enables/disables the field weakening function (Par 469 [Field Mode Sel])
Freeze Ramp	Holds the speed ramp at the present value (Par 373 [Freeze Ramp]).
UsrDefinedA0-7	Writes the value of the digital input to Pars 520 [UsrDefBitWrdA0] - 527 [UsrDefBitWrdA7].
Droop Enable	Enables/disables the Droop function (699 [Enable Droop]).
PD Enable	Enables/disables the PD block of the PID regulator (Par 770 [Enable PD]).
PI Cent vs0 - 1	In combination, the digital inputs set to “PI Central vs0” and “PI Central vs1”, through binary selection, determine which of the four possible output values is used as the initial level of the integral component (corresponding to the initial diameter) of the PI block. Refer to Par 780 [PI Central vs0] for binary selection values.
Diam Calc	When asserted initiates the diameter calculation (Par 794 [Diameter Calc]).
Diam Reset	Sets the diameter starting value to the value in Par 1168 [Diam Preset Sel].
DiamCalc Dis	Enables/disables the diameter calculation (Par 1161 [Diameter Calc Dis]).
Torq Wind En	Enables/disables the Center wind function (Par 1209 [Torque Winder En]).
Speed Match	When asserted, issues the coil 'launch phase' command for automatic switching (Par 1195 [Speed Match]).
Diam I/D En	Enables/disables the ability of the diameter calculation to increase for an unwider or decrease for a winder (Par 1205 [Diam Inc Dec En]).
Wind/Unwind	Sets the value of Par 1187 [Winder Type] to “0” Winder or “1” Unwinder .
Diam Preset0 - 1	Selects the value of Par 1164 [Diam Preset 0], 1165 [Diam Preset 1], Par 1166 [Diam Preset 2], or Par 1167 [Diam Preset 3] See Par 1168 [Diam Preset Sel].
Taper Enable	Enables/disables the Taper function (Par 1176 [Taper Enable]).
Spd DemandEn	Enables/disables the speed reference calculation (winder operation), (Par 1215 [Speed Demand En]).
Winder Side	Selection of the winding/unwinding side (0 = up, 1 = down).
PI-PD Enable	Selection between PI and PD (winder operation), (Par 1201 [Winder Side]).
Jog TW En	Enables/disables the Torque Winder jog function (Par 1256 [Jog TW Enable]).

1 A digital input (1-8 only) must be configured for “Enable”.
2 This option is not available (“Reserved”) for digital inputs 9 - 12.

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
INPUT / OUTPUT	Digital Inputs	564	**[Dig In Status]** Status of the digital inputs.	Read Only			

	Reserved	Reserved	Reserved	Reserved	Digital In12	Digital In11	Digital In10	Digital In9	Digital In8	Digital In7	Digital In6	Digital In5	Digital In4	Digital In3	Digital In2	Digital In1
Default	x	x	x	x	0	0	0	0	0	0	0	0	0	0	0	0
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

565 566 567 568 569 570 571 572 573 574 575 576	**[Dig In Term 1]** **[Dig In Term 2]** **[Dig In Term 3]** **[Dig In Term 4]** **[Dig In Term 5]** **[Dig In Term 6]** **[Dig In Term 7]** **[Dig In Term 8]** **[Dig In Term 9]** **[Dig In Term 10]** **[Dig In Term 11]** **[Dig In Term 12]** Status of the digital inputs. 0 = Low 1 = High	Default: Min/Max:	Read Only 0 / 1		
1276 1277 1278 1279 1280 1281 1282 1283 1387 1388 1389 1390	**[Inversion In 1]** **[Inversion In 2]** **[Inversion In 3]** **[Inversion In 4]** **[Inversion In 5]** **[Inversion In 6]** **[Inversion In 7]** **[Inversion In 8]** **[Inversion In 9]** **[Inversion In 10]** **[Inversion In 11]** **[Inversion In 12]** inverts the digital input signal.	Default: Options:	0 0 = 1 =	“Disabled” “Disabled” “Enabled”	
1391	**[ContactorControl]** Selects the type of contactor to be controlled by the drive. Either style of contactor (AC or DC) can be used, with or without Dynamic Braking (DB) contactor. The type of control selected determines how many I/O points will be required for contactor control and status. • “Contactor” = 1 (relay) digital output, 1 digital input is used • “Contactor+DB” = 2 (relay) digital outputs, 1 digital input is used	Default: Options:	1 = 0 = 1 = 2 =	“Contactor” “None” “Contactor” “Contactor+DB”	

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
INPUT / OUTPUT	Digital Outputs	145 146 147 148 149 150 151 152	**[Digital Out1 Sel]** **[Digital Out2 Sel]** **[Digital Out3 Sel]** **[Digital Out4 Sel]** **[Digital Out5 Sel]*** **[Digital Out6 Sel]*** **[Digital Out7 Sel]*** **[Digital Out8 Sel]***	Default: Default: Default: Default: Default: Default: Default: Default:	5 = 9 = 2 = 4 = 26 = 0 = 0 = 0 =	"Ready" "Fault" "Spd Thresh" "CurrentLimit" "Alarm" "Not Used" "Not Used" "Not Used"	

Selects the source of the value that drives the digital output. Refer to "Option Definitions" on Option Definitions for [Digital Outx Sel], [Relay Out 1 Sel] and [Relay Out 2 Sel] on page 3-68.
*These parameters are used to configure the digital outputs on the I/O Expansion circuit board.
Options:

0 =	"Not Used"	8 =	"Spd Limited"	16 =	"Encoder Err"	24 =	"Reserved"
1 =	"Spd Zero Thr"	9 =	"Fault"	17 =	"Diam Calc"	25 =	"Reserved"
2 =	"Spd Thresh"	10 =	"Power Loss"	18 =	"Input1 Cmp"	26 =	"Alarm"
3 =	"At Speed"	11 =	"UserDefinedA"	19 =	"Diam Reached"	27 =	"Running"
4 =	"CurrentLimit"	12 =	"UserDefinedB"	20 =	"Speed Match"	28 =	"Jogging"
5 =	"Ready"	13 =	"Stop Control"	21 =	"Accelerating"	29 =	"Active"
6 =	"Ramp Pos"	14 =	"Field Loss"	22 =	"Decelerating"		
7 =	"Ramp Neg"	15 =	"Spd Fbk Loss"	23 =	"Brake Cmd"		

File	Group	No.	Parameter Name & Description See page 3-2 for symbol descriptions	Values	Related
INPUT / OUTPUT	Digital Outputs		**Option Definitions for [Digital Outx Sel], [Relay Out 1 Sel] and [Relay Out 2 Sel]**		

Option	Description
Spd Zero Thr	“0” indicates that the drive is operating below the value set in Par 107 [Speed Zero Level] , “1” indicates that the drive is operating above Par 107 [Speed Zero Level].
Spd Thresh	“0” indicates that the drive is operating above the value set in Par 101 [Speed Thresh Pos], “1” indicates that the drive is operating below Par 101 [Speed Thresh Pos].
At Speed	“0” indicates that the actual speed is within the range specified in Par 104 [At Speed Error], “1” indicates that the actual speed is outside the range specified in Par 104 [At Speed Error].
CurrentLimit	“0” indicates that the drive is not limiting output current, “1” indicates that the drive is limiting the output current.
Ready	“1” indicates that the drive is powered, Enabled and no Start Inhibits exist. The state of the assigned digital output matches the state of bit 2 “Ready” of Par 381 [Drive Status 1].
Ramp Pos	“1” indicates that the actual speed of the drive is going positive. Follows the state of Par 346 [Torque Positive]. Not asserted until after the amount of time in Par 20 [Ramp Delay] has elapsed.
Ramp Neg	“1” indicates that the actual speed of the drive is going negative. Follows the state of Par 347 [Torque Negative]. Not asserted until after the amount of time in Par 20 [Ramp Delay] has elapsed.
Spd Limited	“1” indicates that the speed is being limited to the value of Par 3 [Max Speed Fwd], “0” indicates that the speed is not being limited.
Fault	“0” indicates that a drive fault has occurred. Refer to Par 57 [Fault Code].
Power Loss	“0” indicates that the drive has detected a loss of the internal power supply.
UserDefinedA	Indicates the status of Par 519 [UsrDefBitWrdA] (digital input 1 uses bit 0, digital input 2 uses bit 1, etc.). Par 1392 [Relay Out 1 Sel] uses bit 14 (only). Par 629 [Relay Out 2 Sel] uses bit 15 (only).
UserDefinedB	Indicates the status of Par 536 [UsrDefBitWrdB] (digital input 1 uses bit 0, digital input 2 uses bit 1, etc.). Par 1392 [Relay Out 1 Sel] uses bit 14 (only). Par 629 [Relay Out 2 Sel] uses bit 15 (only).
Stop Control	Energized (“1”) at run and de-energized (“0”) based on the value of Par 627 [Spd 0 Trip Delay].
Field Loss	“0” indicates the loss of the field voltage/current while the drive is running.
Spd Fbk Loss	“0” indicates the loss of Speed Feedback/Encoder due to an excessive calculated error, as determined by the drive firmware.
Encoder Err	“0” indicates a loss of the DC tachometer or encoder. Matches the state of Par 651 [Encoder State].
Diam Calc	Energized (“1”) when Par 800 [Diameter Calc St] = 1 and de-energized (“0”) when [Diameter Calc St] = 0.
Input1 Cmp	“1” indicates that the value of analog input 1 is inside the comparison window,“0” indicates that the value of analog input 1 is outside the comparison window (Par 1045 [Anlg In1 Cmp Eq]).
Diam Reached	Energized (“1”) when the value of Par 1158 [Diam Threshold] has been exceeded.
Speed Match	Energized (“1”) when the value of Par 1203 [Spd Match Compl] = “1” (launching ramp completed).
Accelerating	“1” indicates that the drive is actively accelerating. The state of the assigned digital output matches the state of bit 4 “Accelerating” of Par 381 [Drive Status 1] and the state of Par 1188 [Accel Status].
Decelerating	When set to “1” the drive is actively decelerating. The state of the assigned digital output matches the state of bit 5 “Decelerating” of Par 381 [Drive Status 1] and the state of Par 1189 [Decel Status].
Brake Cmd	Energized (“1”) at run (opens the brake) after the value in Par 1263 [Opening Delay] has been exceeded. De-energized (“0”) at stop (closes the brake) after the drive speed goes below the value of Par 1262 [Closing Speed].
ContactorDB	“1” issues the close command to the main contactor and dynamic brake contactor.
Contactor	“1” issues the close command to the main contactor.
Alarm	“0” indicates that a drive alarm has occurred. Refer to Par 1380 [Drive Alarm 1].
Running	“1” indicates that the drive is active in Run mode. The state of the assigned digital output matches the state of bit 2 “Running” of Par 381 [Drive Status 1].
Jogging	“1” indicates that the drive is active in Jog mode. The state of the assigned digital output matches the state of bit 3 “Jogging” of Par 381 [Drive Status 1].
Active	“1” indicates that the drive is active in Run or Jog mode. The state of the assigned digital output matches the state of bit 1 “Active” of Par 381 [Drive Status 1].

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values	Related
INPUT / OUTPUT	Digital Outputs	581	**[Dig Out Status]** Status of the standard digital outputs and relay outputs on the drive and on the optional I/O Expansion circuit board (if present).	Read Only	

	Relay Out2	Relay Out1	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Digital Out8	Digital Out7	Digital Out6	Digital Out5	Digital Out4	Digital Out3	Digital Out2	Digital Out1
Default	0	0	x	x	x	x	x	x	0	0	0	0	0	0	0	0
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

629	**[Relay Out 2 Sel]** Selects the source of the value that drives the N.O. relay between the terminals 75 and 76. Refer to "Option Definitions" on page 3-68. Options:	Default:	5 =	"Ready"

0 =	"Not Used"	8 =	"Spd Limited"	16 =	"Encoder Err"	24 =	"ContactDB"
1 =	"Spd Zero Thr"	9 =	"Fault"	17 =	"Diam Calc"	25 =	"Contactor"
2 =	"Spd Thresh"	10 =	"Power Loss"	18 =	"Input1 Cmp"	26 =	"Alarm"
3 =	"At Speed"	11 =	"UserDefinedA"	19 =	"Diam Reached"	27 =	"Running"
4 =	"CurrentLimit"	12 =	"UserDefinedB"	20 =	"Speed Match"	28 =	"Jogging"
5 =	"Ready"	13 =	"Stop Control"	21 =	"Accelerating"	29 =	"Active"
6 =	"Ramp Pos"	14 =	"Field Loss"	22 =	"Decelerating"		
7 =	"Ramp Neg"	15 =	"Spd Fbk Loss"	23 =	"Brake Cmd"		

1267 1268 1269 1270 1271 1272 1273 1274	**[Inversion Out 1]** **[Inversion Out 2]** **[Inversion Out 3]** **[Inversion Out 4]** **[Inversion Out 5]** **[Inversion Out 6]** **[Inversion Out 7]** **[Inversion Out 8]** Reverses the digital output signal.	Default: Options:	0 = 0 = 1 =	"Disabled" "Disabled" "Enabled"
1275	**[Inversion Relay2]** Inverts the signal for Relay Output 2.	Default: Options:	0 = 0 = 1 =	"Disabled" "Disabled" "Enabled"
1392	**[Relay Out 1 Sel]** Selects the source of the value that drives the N.O. relay between the terminals 35 and 36. Refer to "Option Definitions" on page 3-68. Options:	Default:	25 =	"Contactor"

0 =	"Not Used"	8 =	"Spd Limited"	16 =	"Encoder Err"	24 =	"ContactDB"
1 =	"Spd Zero Thr"	9 =	"Fault"	17 =	"Diam Calc"	25 =	"Contactor"
2 =	"Spd Thresh"	10 =	"Power Loss"	18 =	"Input1 Cmp"	26 =	"Alarm"
3 =	"At Speed"	11 =	"UserDefinedA"	19 =	"Diam Reached"	27 =	"Running"
4 =	"CurrentLimit"	12 =	"UserDefinedB"	20 =	"Speed Match"	28 =	"Jogging"
5 =	"Ready"	13 =	"Stop Control"	21 =	"Accelerating"	29 =	"Active"
6 =	"Ramp Pos"	14 =	"Field Loss"	22 =	"Decelerating"		
7 =	"Ramp Neg"	15 =	"Spd Fbk Loss"	23 =	"Brake Cmd"		

1393	**[Inversion Relay1]** Inverts the signal for Relay Output 1.	Default: Options:	0 = 0 = 1 =	"Disabled" "Disabled" "Enabled"

File	Group	No.	Parameter Name & Description *See page 3-2 for symbol descriptions*	Values			Related
INPUT / OUTPUT	DPI Inputs	1323	**[DPI P1 Select]** Selects the destination of the reference value from DPI Port 1.	Default: Options:	0 = 0 = 1 = 2 = 3 = 4 = 5 = 6 = 7 = 8 =	"Off" "Off" "Speed Ref A" "Speed Ref B" "Trim Ramp" "Trim Speed" "Torque Ref" "Trim Torque" "Pos Cur Lim" "Neg Cur Lim"	
		1324	**[DPI P2 Select]** Selects the destination of the reference value from DPI Port 2.	Refer to Par 1323 [DPI P1 Select].			
		1325	**[DPI P3 Select]** Selects the destination of the reference value from DPI Port 3.	Refer to Par 1323 [DPI P1 Select].			
		1326	**[DPI P4 Select]** Selects the destination of the reference value from DPI Port 4.	Refer to Par 1323 [DPI P1 Select].			
		1327	**[DPI P5 Select]** Selects the destination of the reference value from DPI Port 5.	Refer to Par 1323 [DPI P1 Select].			

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